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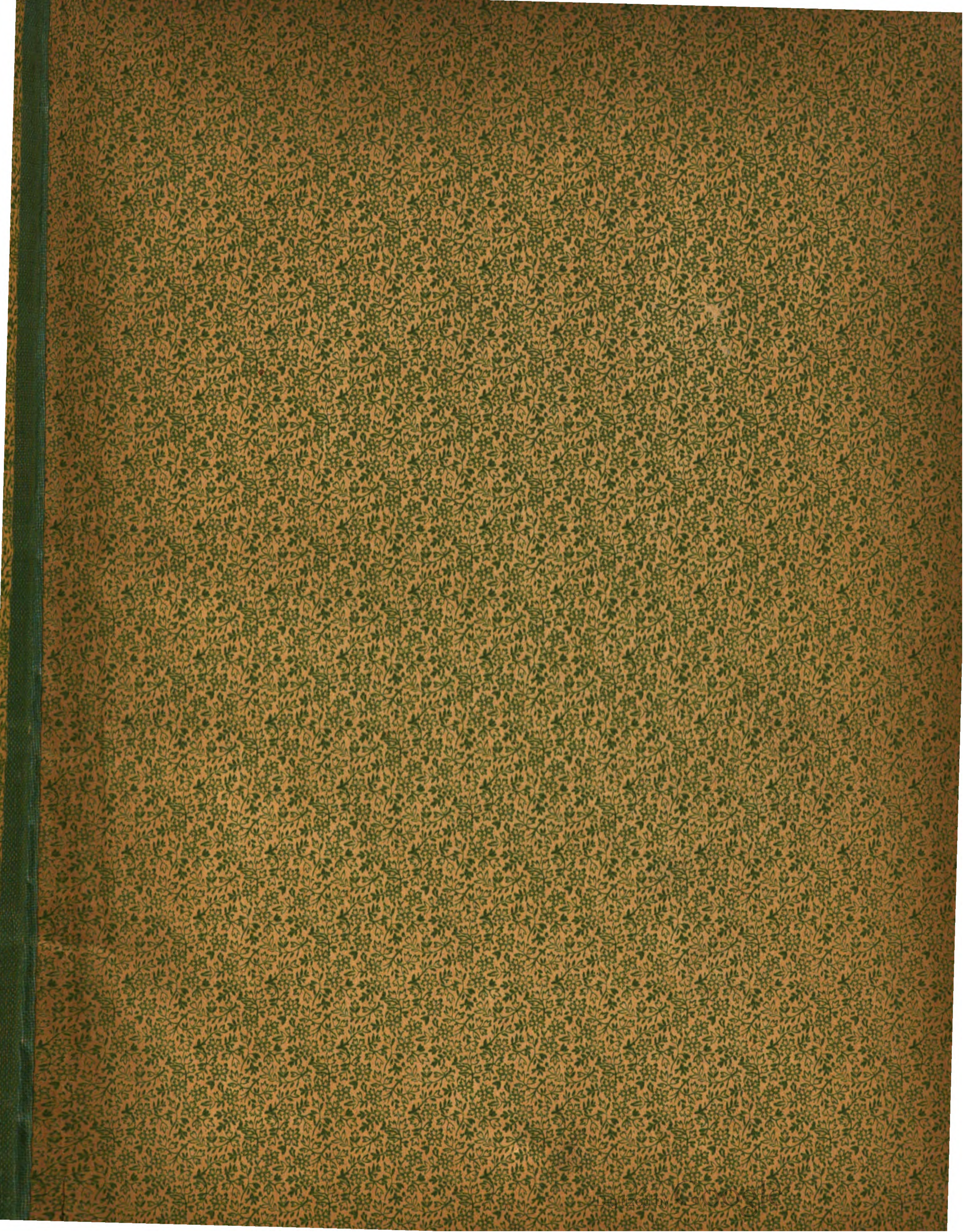


THE NATIONAL FIRESAFE BUILDING PUBLICATION

CONSTRUCTION

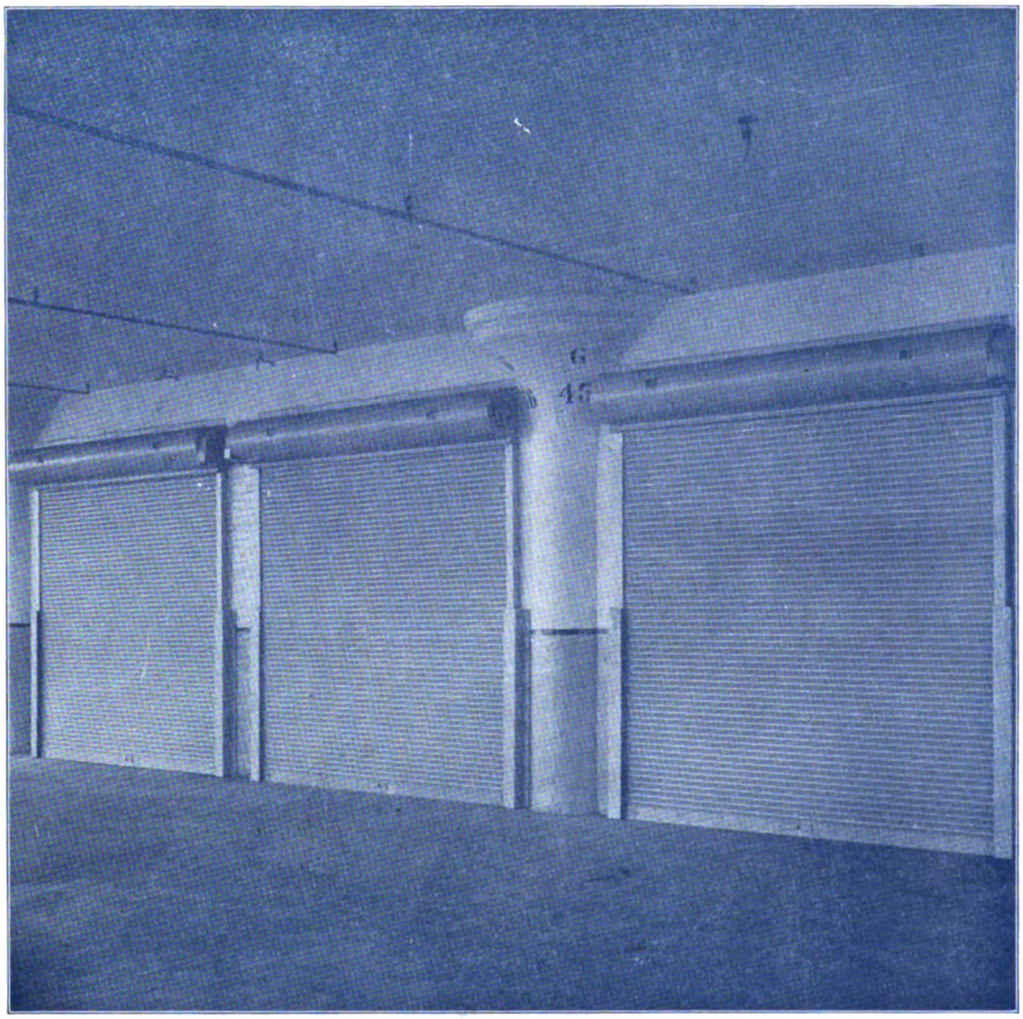
WITH A DEPARTMENT DEVOTED TO

SAFE HOMES

JANUARY 1919

VOLUME EIGHT NUMBER ONE

A JOURNAL FOR ARCHITECTS, PROPERTY-OWNERS, CONTRACTORS, BUILDERS, UNDERWRITERS, FIRE PREVENTION ENGINEERS AND CITY OFFICIALS



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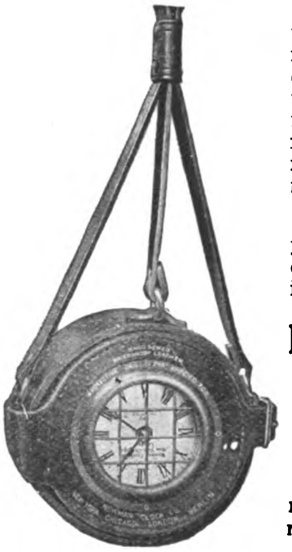

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CONSTRUCTION

ADVOCATING THE CONSISTENT USE OF FIREPROOFING MATERIALS & PROTECTIVE DEVICES

George A. Watson, Editor
Bruce E. Loomis, Ins. Eng. Editor

Ralph P. Stoddard, Associate Editor
Wm. Wallace Ewing, Consulting Eng.

Volume Eight **Number One**

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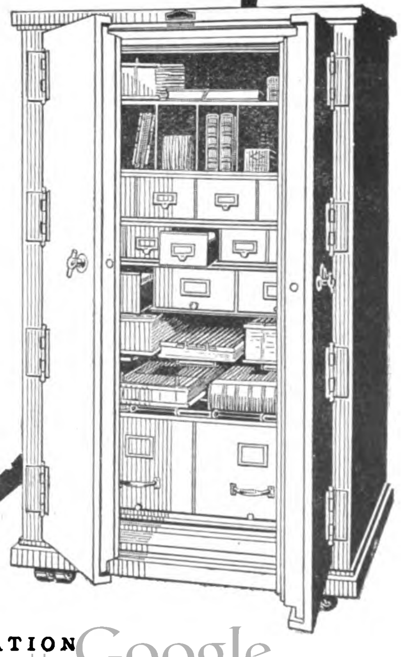

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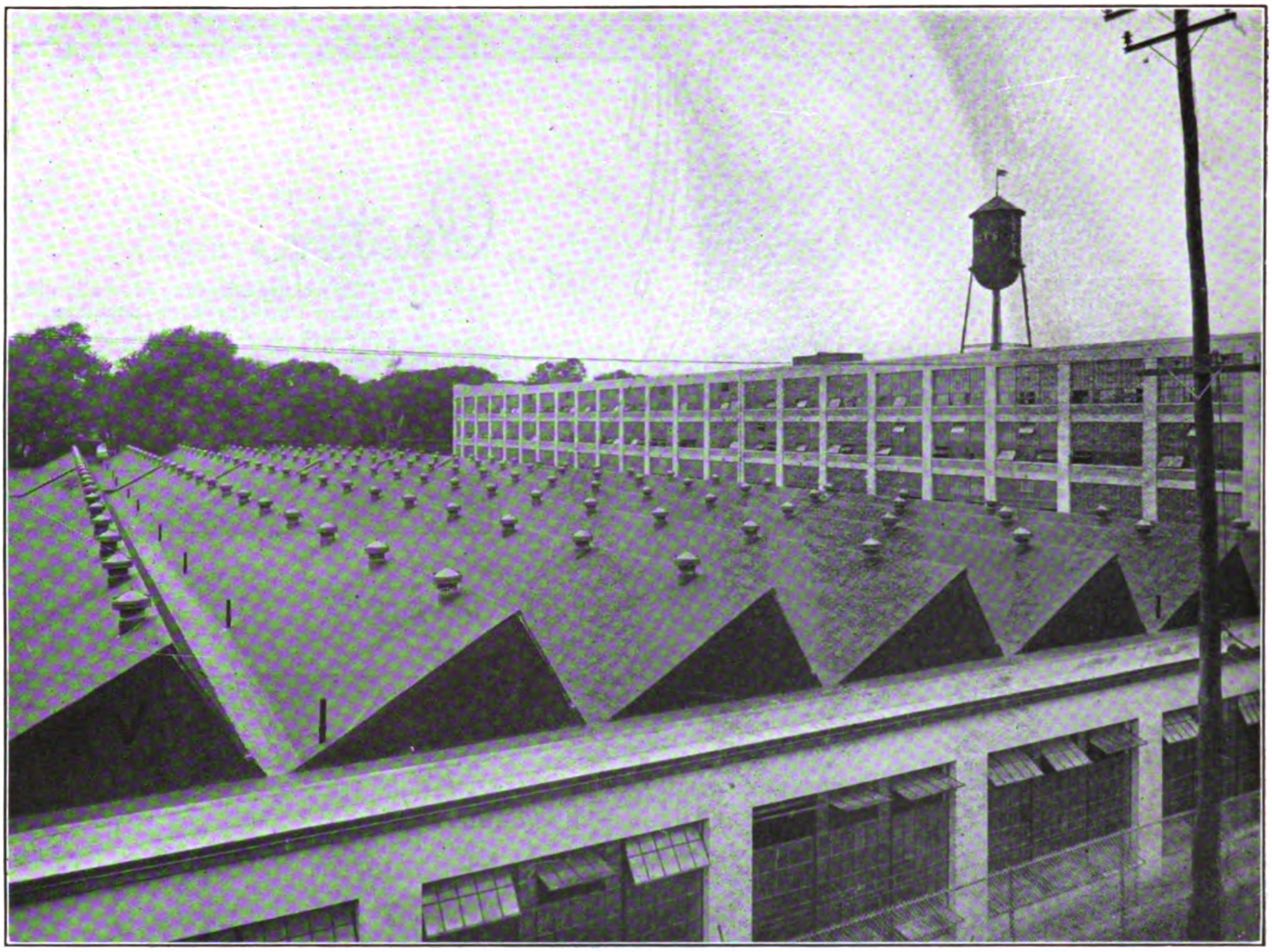

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CONSTRVCTION

ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

VOL. VIII JANUARY, 1919 No. 1

Prohibit Use of Dangerous Wooden Shingles

As the result of "a long and painstaking" investigation the Committee on Construction of Buildings of the National Board of Fire Underwriters has compiled a list of cities in the United States prohibiting the use of the dangerous wooden shingle as a roof covering within their corporate limits. The list is as here given:

Alabama: Florence, Huntsville, Montgomery, Sheffield.

Florida: Bradentown, Daytona, Fernandina, Jacksonville, Lakeland, Ocala, Orlando, Sanford, South Jacksonville, St. Augustine, St. Petersburg, Tallahassee, Tampa, West Tampa.

Georgia: Atlanta, Augusta, Brunswick, Columbus, Decatur, Dublin, Hawkinsville, Kirkwood, Macon, Manchester, Savannah, Tifton, Valdosta, West Point.

Illinois: Springfield.

Iowa: Davenport.

Louisiana: Baton Rouge, Donaldson, Napoleonville, New Orleans, Shreveport.

Massachusetts: Boston, Brookline, Cambridge, Chelsea, Fall River, Lawrence, Lexington, Lynn, Medford, New Bedford, Newton, Salem, Somerville.

Mississippi: Jackson, Meridian, Vicksburg.

New Jersey: Atlantic City, Hawthorne, Hoboken, Newark, Paterson, Perth Amboy, Trenton.

New York: Albany, Solvay.

North Carolina: Asheville, Durham, Raleigh, Winston-Salem.

Pennsylvania: Allentown, Easton, Hanover, Reading.

South Carolina: Charleston, Columbia, Darlington.

Tennessee: Chattanooga, Jackson, Knoxville, Memphis, Nashville.

Texas: Dallas, El Paso, Galveston, Paris, San Antonio.

Virginia: Buena Vista, Martinsville, Norfolk, Richmond, Suffolk, Warrentown.

In all ninety-one cities by specific enactment refuse to permit their fire safety to be menaced by the inflammable wooden shingle. The list is a respectable one, but falls far short of what it should be and doubtless will be in the near future. Indeed, no good reason exists why wooden shingles should be permitted anywhere, now that asphalt and other reliable forms of roofing may be had at very reasonable figures. Time and again conflagrations in this country have traveled along the inviting wood shingle route, and bitter has been the experience in such connection of Chelsea, Salem, Atlanta, Augusta, Paris, Nashville and other fire-swept communities. No wonder they now forbid the use of wooden roofings. Had they taken such action years ago they would have been spared the loss of millions of dollars.

Experienced fire-fighters and insurance men the country over are a unit in their opinion of wooden shingles, and that opinion is they should never be permitted to cover an exposed roof.

Should Build Fire-Proof Cotton Warehouses

Under the new economic conditions existing in the South farmers are not disposing of their cotton immediately it is ready for picking as in former years, but instead are storing it in warehouses until such time as market quotations favor its sale. To insure the safety of the product against fire the cotton should be placed in warehouses that are as nearly fireproof as it is possible to make them. Their exterior and partition walls should not only be of well-built masonry, but fire doors and sprinkler equipment should be installed, and many of the modern warehouses of the South are so protected.

The "Houston Post" goes further and strongly urges farmers who may intend storing cotton upon their farms to shun the inflammable shed and erect a building that will be highly fire resistive. The advice is sound and Southern farmers will do well to heed it.

Holding Off for Lower Prices

MAINTAINING that present prices for material and labor are too high to permit of profitable building operations, many prospective builders are holding off for lower figures in both directions, and insist that such reductions will come about in the near future.

That this conclusion is an erroneous one and that production costs are to remain at their present levels is the firm conviction of many astute business men who have studied the situation and whose opinions are usually held to be sound.

Discussing the general subject of new building enterprises, Joseph E. Otis, vice-president of the Central Trust Company of Illinois, said:

"I have no sympathy with the man who is sitting back, awaiting lower prices. The people who are waiting a drastic decline in prices aren't going to get it; they are going to get left. In other words, I do not believe we are going to see any immediate and drastic decline in commodity prices. There is a world-wide scarcity of many materials and production costs are going to continue abnormally high.

"We have had perhaps a certain amount of inflation. To the extent that present high prices are due to that cause, moreover, we can expect no immediate decline. The process of deflation will be gradual.

"If we were all to hold back, awaiting lower prices, we should produce conditions of a sort that would benefit no one. It is the duty of business to go ahead and seize the opportunities now awaiting. If a manufacturer were to defer building needed additions to his plant, in the hope of securing a lower construction cost at some indefinite time in the future, he probably would lose more profits on goods which he might have been producing and selling in the meantime than he will save on cheaper construction costs."

Frank W. Thomas, of A. O. Slaughter & Co., said:

"In considering the outlook for commodity prices we must bear in mind that wages are going to continue high for an indefinite time, and that European competition, formerly so keenly felt in our markets, is not going to be so severe as it was before the war. Wages have been advanced abroad with no immediate prospect of their return to the pre-war basis."

Frank A. Vanderlip, president of the National City Bank of New York, in an address delivered in that city recently declared that it is possible to transfer 15,000,000 men now engaged in war activities to works of peace without greatly disturbing conditions.

"I would not argue that we can make this transition without any jolt," he said. "There will be some. But I believe the demand for labor is so great that it is possible to make the transition without disaster.

"We may make a cushion of public works. That is possible. But there are really tremendous orders that may now be executed, and on the whole I would not be surprised to find that we shall see no surpluses of labor, providing labor and the employer of labor each does his best to help in this readjustment."

John N. Willys, president of Willys-Overland Company, says:

"Material prices and wages are not likely to come down in a hurry. With the passing of the first flurry of unsettlement of prices which followed the signing of the armistice there is now a noticeable steadying of the market."

Converting Stores Into Flats

WITH the enactment of prohibition laws by many states, and the certainty that the nation will be upon a bone-dry basis within the next twelve months, owners of properties in which saloons are tenanted are facing the problem as to how the premises can be re-rented, or other use made of the soon-to-be-vacant space. As a rule, saloons are located upon street corners, and though from a physical standpoint the upper floors of the buildings are desirable, affording as they do abundant light and ventilation, they are hard to rent even at much lower figures than those received from less well situated flats.

In New York City many former stores are being converted into flats, their owners discovering that stores, though paying higher rents than living premises, are apt to be vacant for considerable periods, while flats are always in demand. The absence of stores, too, makes the upper floors more desirable for residential purposes and assures better rentals from the entire structure.

Conversion of stores into flats is not expensive and the general appearance of a building can be improved at comparatively slight cost.

With new building operations still greatly depressed, architects could find lucrative scope for their talent if they would carefully study the store conversion idea, and present definite plans to property owners.

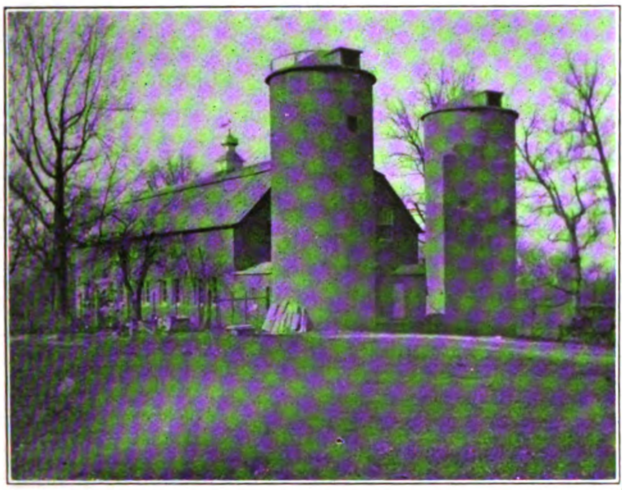
Seek Compulsory Sprinkler Law

A COMPULSORY sprinkler ordinance is being agitated in Cincinnati, the fire fighters of that city being very anxious that such legislation be enacted. Throughout the congested district of Cincinnati are many long, narrow buildings in which fire could only be fought from the front, the alleys in the rear being too limited in width to permit the passage of fire apparatus. While conceding the value of automatic sprinklers the owners of many of the properties refuse to install them on the ground of expense; hence the desire of the fire-fighters for the passage of compulsory legislation.

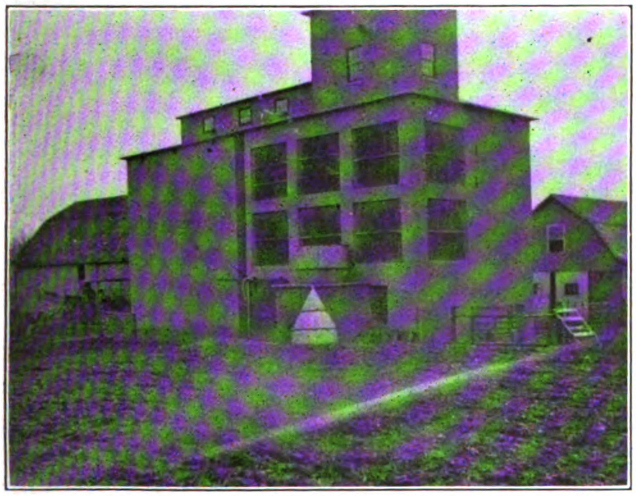
Farm Buildings of a Thoroughly Advanced Type

UPON his extensive farm at Versailles, Ky., United States Senator J. N. Camden lately completed the erection of a number of barns and outbuildings that are models of their kind; being of substantial construction, attractive in design and well safeguarded against fire, Mr. Camden having the last named element clearly in mind in the grouping of the buildings and their individual construction.

Two years ago Mr. Camden, who is a man of wealth and always willing to do what he can to benefit his fellows along practical lines, determined to farm his 2,400-acre estate, following intensive methods, and thus demonstrate to the farmers in that section of Kentucky the possibilities of general farming and stock-raising when carried on in a thoroughly scientific manner.



Dairy Barn With Concrete Silos

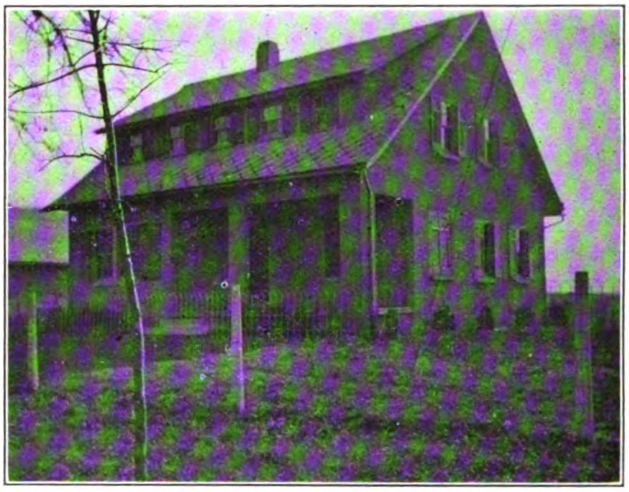


Grain Elevator Located Convenient to Barns

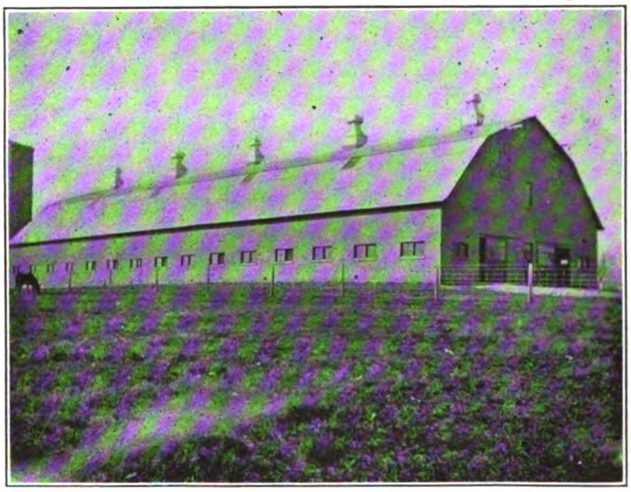
After securing the services of a manager and a general superintendent for the property, the important question of buildings to house the stock and the crops was taken up and very attentively studied, advice being sought from those well qualified to speak upon the subject.

Final decision favored reinforced concrete for the general construction of the buildings, with iron purlins on the roof covered with Ambler asbestos corrugated sheeting. The stable equipment and ventilators are all of iron, while the electric lighting system was installed under the advance code and is first class in every respect.

Realizing the economic drain placed upon the country through the constant destruction of property by fire, Mr. Camden determined that the buildings upon his farm should be as free from this menace as possible; hence the care exercised in selecting materials that are highly fire resistive.

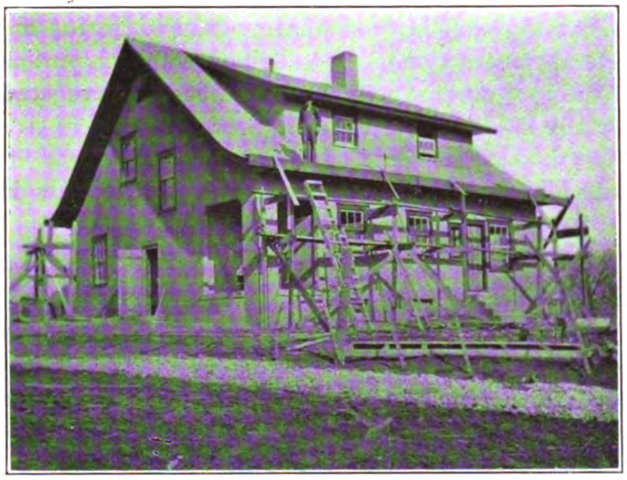


Care-taker's Cottage—Note Absence of Wood Throughout Its Construction



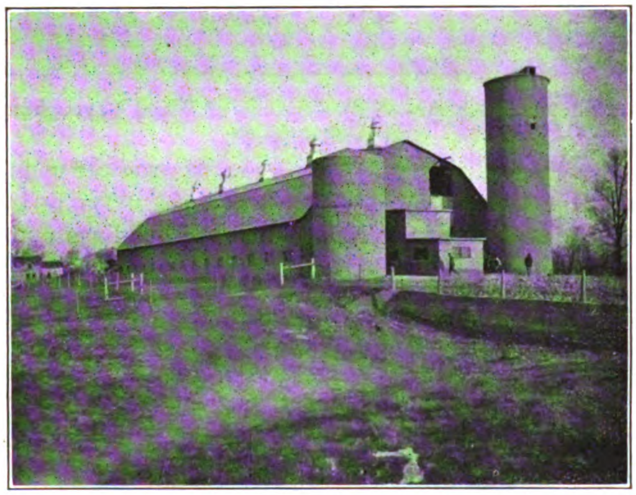
Cattle Barn—Spacious—Well Ventilated and Safe from Fire

Equally important as the selection of proper building materials in the mind of the Senator was the choice of contractors capable of doing high grade work, and carrying out in letter and spirit the plans of the designers. The contract for general construction was given to A. J. Stoesser & Company, of Chicago, who completed the work in a thoroughly satisfactory manner.



Cottage Nearing Completion—Its Deterioration Will be Slight Indeed

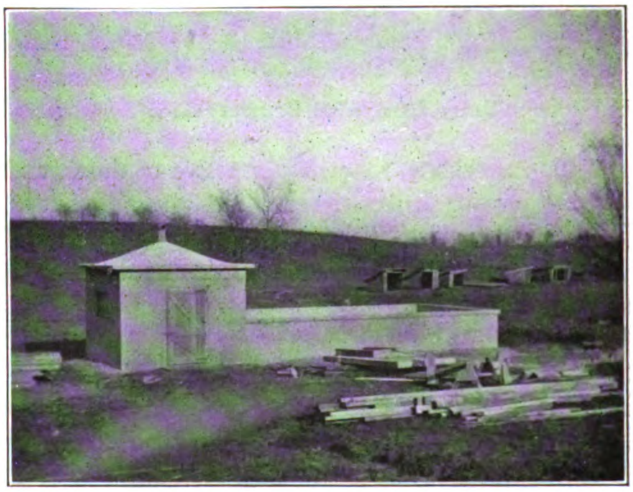
From the accompanying illustrations an idea may be gained of the permanent type of farm buildings selected by Senator Camden, and which, upon a modified scale, might with advantage be copied by farmers generally throughout the country in place of the great wooden structures that now exist, and which not only afford harbors of refuge for rats and other vermin, but are a constant fire menace, and expensive to keep in repair; conditions that do not apply to the masonry buildings. As the barns of Mr. Camden shelter a large herd of pure-breed cattle—Hearsford, Holstein and Jerseys being the favorites, and flocks of high grade sheep—it is essential that they be of such construction as will not endanger the safety of their occupants, and this has been assured.



Another View of Main Cattle Barn—184 by 67 Feet

Horse Barn—120 Feet by 44 Feet

From the pictures here given it will be noted that the houses upon the farm are neat, comfortable and convenient in arrangement, and so well built as to withstand the elements. The masonry walls and asbestos roofing insure against fire, while the depreciation from year to year will be slight indeed.



Water Works—Insuring Cleanliness as Well as Safety

The barns are roomy and well ventilated and their equipment is of the most modern type.

Even the smaller buildings are of masonry construction, Senator Camden realizing how rapidly such buildings, if of wood, deteriorate and become eye-sores, as well as breeding spots for fire.

H. S. Moore, manager of the Cincinnati office of the Keasbey & Mattison Company, among others was consulted by Mr. Camden regarding the proper building materials to be used upon his farm, and needless to say, the Keasbey & Mattison products have a prominent place in the general construction.

Many Building Projects Now Underway

"BUILDING interests in many parts of the country are showing confidence in the early resumption of building and construction work on a scale approaching normal," says a statement issued by the Department of Labor. "Many contractors of authoritative experience express the conviction that prices of materials and labor will not be lowered for several years and those who delay building in the hope of availing of a return to pre-war prices may be sadly disappointed.

"American building industries will be called upon to furnish tremendous quantities of materials for European construction. If no other elements were present to keep up material prices Europe's demand would prevent any immediate drop in them, according to the opinion of many material manufacturers and contractors. Reduced production during the war in the building materials industries and the marked curtailment—almost suspension—of private building undertakings have fomented market conditions which do not make for lower prices.

"Charles A. Bowen, secretary of the National Lumber Dealers' Association, on information obtained from some 500 members, asserts the shortage in buildings is universal and the retail branch of the lumber industry does not anticipate material changes in the market prices for some time. In a recent interview Mr. Bowen said conditions in the lumber industry suggest more of a possibility of a raise in lumber prices than a decrease. He was quite positive in the assertion that persons who deferred building for cheaper materials might have to delay so long that by the time they were ready to build their interest would be more in undertakers' supplies than in house materials.

"There is a shortage of houses throughout the country. Information obtained by the Department of Labor indicates that the nation is more than a half million houses behind the demand for dwellings. The department believes nothing more helpful to the general situation could be done than at once to resume building. The homes are needed; it is very doubtful if labor or material conditions and prices will improve for several years. Building, being a basic industry, if accelerated, will add impetus to general business throughout the country.

"As evidence that building and construction industries are going ahead and getting under way, the following activities are interesting:

Eight Million Dollars at Buffalo

Buffalo has outlined an $8,000,000 building programme. Twelve new schoolhouses will be built and work begins at once.

Indianapolis is rushing work on a gigantic scheme of track elevation. The work has been going on all winter. The city is starting in to remodel many of its school buildings.

Columbus, Ohio, is to have $1,500,000 worth of new warehouses built by the Federal government.

Bronx, N. Y., will build a $200,000 school building.

Waterbury, Conn., is to build a $150,000 school building

State of Connecticut is to build highway and trolley bridge near Stratford, to cost $900,000.

East St. Louis plans a community high school to cost $100,000.

Cleveland Heights will spend more than $500,000 on high school buildings.

Newark, N. J., is to have a $400,000 boys' industrial school.

Massachusetts is to build a school for feeble minded at a cost of $150,000.

Contemplated building activities by private interests brought to the attention of the Department of Labor include the following:

A. J. Johnson & Son, Chicago, $150,000 furniture factory; William S. Barbee, Chicago, $150,000 moving picture theatre; Conlon Electric Washer Company, Chicago, $200,000 manufacturing plant; Williamsburg Hospital, a $350,000 building in Brooklyn; Y. M. C. A. in Haverhill, Mass., a $100,000 building; Wisconsin National Bank, Milwaukee, Wis., a $1,000,000 building; H. S. Riortz & Co., Cleveland, $300,000 warehouse; Phipps Estate, Pittsburgh, Pa., $150,000 building; Jacques Amusement Company, a $200,000 theatre in New Haven, Conn.; Field Furniture Company, $100,000 store building in Ashland, Ky.; Swift & Co., a fertilizer building, $150,000, in Kearney, N. J.; National Machine Company, $100,000 in Cleveland, Ohio.

"Field men from the Division of Public Works and Construction Developments, Information and Education Service, of the Department of Labor, are now visiting the larger cities of the country, conferring with municipal and state authorities and the leading organizations which touch the building industry, endeavoring to assist the local initiative in getting municipal and private building and construction work under way. The department's basic interest is to stimulate general business and afford what may be designated as 'buffer employment' for labor during the months necessary for the transition from a war to peace basis in industry."

Building of Public Works Recommended

AFTER a critical study of labor conditions throughout the country Secretary of Labor Wilson is convinced that there is not the "remotest possibility of securing any reduction in wage rates from their present basis."

Discussing this subject and the oft-made suggestion that the Government undertake extensively the building of public works, Mr. Wilson says:

"I am of the opinion that from the time we restore ourselves to our normal post-war activities, the demand for peace-time production will be so great that there will not be the remotest possibility of securing any reduction in the wage rates from their present basis. I feel further that the manufacturer who fails to take into consideration the prospects of the future and who, in a hope of securing cheaper labor or cheaper raw material, does not build up his organization and maintain it during the possibly brief period of readjustment, will be handicapped in securing his share of the business afterwards; because he will be handicapped through lack of working forces in his factory.

"It therefore seems to me that the situation resolves itself into taking care of the possible problem in the interim between our ceasing war activities and the time when we have assumed our natural post-war activities.

"With the attitude of mind that I have expressed as existing on the part of some manufacturers relative to waiting for a lowering in the prices of raw material and the price of labor, it may be that the restoration of industry will not take place as rapidly as the demobilization takes place. We are not sure of that. There ought to be provision made for a reservoir that would absorb the demobilized workers and the demobilized soldiers, not in doing the things which there is no need to have done, but in doing the things that ought to be done—that are valuable for peace-time purposes—a reservoir that will take care of them for the brief period between their dismissal from the army or the dismissal from the war industries until they can be reabsorbed into the natural post-war industrial activities.

Plans of Agricultural Department

"The Department of Agriculture is taking steps to accomplish part of that purpose in the matter of road improvement, highway improvements, on the theory Congress has acted on in the past, that for military purposes and for postal routes, roads are necessary all over the country. Where men are employed in road-building, they do not have to be taken from their own home communities to engage in the work. The Department of Agriculture, therefore, has asked or is about to ask for an increased appropriation which will enable it, in co-operation with the respective states, to engage in a nation-wide project of road-building that will absorb, if need be, some of these workers temporarily, until industry resumes its natural course.

"During the period of the war, by virtue of the shortage of workmen, there has been little or no municipal activity in building operations, in park extensions, in sewerage extension, water works, or any other of the public utilities. They have been delayed and postponed because of the shortage of man-power and because of the inability to finance. We are suggesting, through the Department of Labor, to the various municipalities throughout the country, the advisability of their resuming these activities at as early a date as possible.

"Whenever it is possible to utilize public means, wherever it is possible to undertake public work, or things that are valuable for peace-time purposes, it should be undertaken as promptly as possible. It may not be needed, but it ought to be provided so that it can be utilized if it is needed.

"Personally, I am opposed to the creation of work solely for the purpose of giving employment to somebody. I look upon that as being so much waste; wasted intelligence, wasted energy, and waste of material. But the same argument cannot be made against employing labor for useful purposes, and this should always be borne in mind that, if you have millions of men out of employment and by virtue of their being out of employment, unable to supply food and clothing and shelter for their families, they are going to insist upon the opportunity of earning a livelihood.

Duty of the Government

"I am not one of those who take the ground that a country or a government owes every man a living. But all governments, all organized society, is man-created, and, consequently, more or less artificial because of the restrictions that must of necessity be imposed for the purpose of enabling us to live in harmony with each other. And because of those restrictions, men have not always the opportunity of working for themselves and I am one of those who believe that all good governments will see to it that every man has the opportunity to earn a living. In other words, the Government does not owe him a living, but it owes him the opportunity to earn a living."

Favor Brick and Concrete Construction

AT a recent meeting of the Board of Freeholders of Essex County, N. J., it was recommended that the plans previously prepared for the erection of new buildings at the Essex Mountain Sanatorium be discarded, and a new set of drawings be made for structures of brick, concrete and hollow tile.

The buildings under consideration are those for which a $119,000 bond issue recently was issued. Bids for their construction were received after advertisement the day before the old Board of Freeholders passed out of existence, but were rejected without opening.

Originally it was planned to erect a hospital building with a capacity of ninety-six beds and four one-story pavilions which, combined, would have the same capacity. For this work a bond issue of $250,000 to $300,000 was planned. The Government restricted the proposed construction to the four pavilions and sanctioned a bond issue which would provide not more than $900 per bed capacity. So the plans were changed to bring the cost of construction within the limit set.

Although the Government's restrictions now have been removed, the idea is to adhere to the four-pavilion limit and not return to the plan for including the hospital building. The type of construction advised by the Government is declared to have been almost a reduction to that of the army cantonments.

The change now proposed will increase the cost twenty-five per cent., or more, it is said, and probably necessitate the issuance of more bonds. While the unstable condition of the material market does not permit of certain approximation, it is estimated that the cost will run between $150,000 and $200,000.

Jordan Green, of Newark, the architect who prepared the present plans and who, it is anticipated, will be employed to design new ones, said he considered the withholding of the contract a wise move. He declared the type of construction originally planned, before rulings by Government war boards caused a change in plans, would give greater satisfaction and cost less in the end. The exposed position of the sanatorium site on the mountain top at Verona, he said, would cause rapid deterioration of the types of construction known as semi-permanent with resulting high cost of upkeep and repair. The inaccessibility of the site, 450 feet above Fairview avenue, for fire apparatus made it desirable that the construction be fireproof, he added.

Falling prices of materials were going to result to the benefit of the county, too, Mr. Green declared.

If ordered at once, the architect said, new plans and specifications could be ready by March 1, which would permit the awarding of the contract so that work could begin about April 1.

Future of Structural Work in Canada

IN a recent survey of building prospects in Canada Wyatt Malcolm, of the Department of Mines, Ottawa, said in part:

"Structural work of all kinds has been at a standstill for several years. The promptness and rapidity with which renewals will be made depends much on the purchasing wealth of the country. It is unsafe to say whether there will be a brisk demand for structural materials such as steel, cement, stone and clay products, or whether we shall decide that existence for some time under present conditions with a gradual recovery is preferable. The optimist sees the following promising features: There is a great dearth of dwelling houses; the Federal Government is prepared to make loans to the extent of $25,000,000 to correct this condition, and the provinces and municipalities may supplement this amount; manufacturers are coming to recognize that good housing serves as a great stabilizer of labor; farmers are prosperous and are likely to keep their buildings in good repair; municipalities will resume work on sewers, sidewalks and pavements; there may be a great increase in power development; the construction of the Welland Canal is to be taken up, and harbor improvements, highway construction, and other public works will probably be undertaken."

Will Build Many Postoffices

THE first definite step toward resumption of the construction of postoffices, suspended a year ago on account of war conditions, was taken recently by the Treasury Department in advertising for bids on Federal buildings in thirty-seven communities over the country. Contractors were asked to submit proposals on certain dates in January. The total costs of the buildings will be several million dollars.

Analysis of the bids may show that the higher cost of materials and labor now over prices at the time of the original appropriations will require additional authorizations by Congress in many cases.

Two New Hotels for New York City

Within the past month the capacity of New York City to comfortably house its permanent residents or visitors has been substantially increased through the opening of new hotels of a very superior type—the Hotel Pennsylvania, opposite the Pennsylvania Railway terminal on 33rd Street, and the Hotel Commodore, adjoining the Grand Central Depot on 42nd Street.

The Commodore is a thirty-three story structure: five below the street level and twenty-eight above. Approximately 16,000 tons of steel were used in the skeleton erection. It was built from plans prepared by Warren and Wetmore.

50,000 Dwellings Needed in England

HOW the shortage of housing facilities is becoming intensified abroad is illustrated by a report received by the Department of Commerce from Commercial Attache Philip B. Kennedy at London. He writes:

"One of the great problems facing the authorities at the present time is the provision of housing facilities for the thousands of new people who are daily arriving in London. Under the heading, 'One Million Persons Too Many in London,' the 'Evening News' gives an insight into conditions and summarizes the causes of the overcrowding as follows:

"After the passage of the land valuation act in 1910 house building in London, as well as all over the country, began to decline.

"The creation of Government departments and bureaus for war work has brought thousands of people into London. There are approximately 130,000 people employed in clerical work relating to the war, and 900 buildings have been taken over by the Government in which to house them. These buildings, in the main, have been large hotels, which has caused added congestion to the hotels not affected. In a good many instances these war workers have brought their families with them, causing quite a demand for small flats and houses, and resulting in congestion and insanitation.

"The housing of the transient or floating population, made up of soldiers and sailors on leave, is one of the chief factors which is causing concern.

"Transportation facilities are inadequate, especially in the tubes and busses. This has been due to the shortage of rolling stock and labor, but the situation is being relieved as rapidly as possible and new trains are being added. The gasoline restrictions heretofore in effect have caused the bus companies to curtail their service, but now that this restriction has been relaxed a better schedule is being maintained.

"It is estimated that 100,000 new houses are needed in London alone. During the war 1,500 houses have been condemned as insanitary and should not have been used, but under the circumstances they had to be occupied. The London County Council has 106 acres on which houses are to be built at once which can accommodate 17,000 persons. It is proposed to spend 3,500,000 pounds ($17,032,750) on this programme. Other councils in Greater London have made application to erect houses on 60,000 acres.

"The Local Government Board has a scheme for erecting 300,000 houses, but the procuring of the material required is a great problem. Six thousand million bricks, 94,000,000 cubic feet of timber, 2,500,000 windows and 3,000,000 doors are needed for these houses. British industries at present cannot furnish all these materials, and the Government will have to import considerable quantities.

"Apart from present overcrowding, if London's population continues to grow at the rate it did before the war, 145,000 houses to accommodate 720,000 persons must be built by 1928, in addition to those for people to be rehoused from cleared slums and those now living in overcrowded houses. At least 500,000 houses are needed in this country, involving the expenditure of some 200,000,000 pounds (roughly $1,000,000,000)."

To Sell Government Owned Material

AS arranged by the Director of Sales of the War Department Major W. M. Crunder will have charge of the sale of all surplus building material, including: lumber, millwork, fire and water protection supplies, fabricated steel, roofing, wall board, paints, hardware, brick, cement, electrical equipment, etc.

The Board of Sales Review has given clearance for the Construction Division to sell surplus building materials at Camp Grant valued at approximately $867,000, including lumber, miscellaneous building materials, electrical equipment, hardware, heating material, plumbing material, mill work and miscellaneous goods. These materials will be disposed of from time to time as demand requires in the following manner:

Lumber to be sold through producers in line with general agreement with them.

Remainder of material to be sold in one of the following ways:

(1) Cash at auction.

(2) To highest bidder on sealed proposal on due public notice and in such market as the public interests require.

(3) At the current market price if there is an established market for such property and current market quotations accompany the report of the sale, or at current market price as determined by a Board of Appraisal.

The latter method is the general method employed by the Construction Division in most instances.

31-Story Mercantile Building

Charles E. Birge, architect, is preparing plans for a 31-story office building to be erected on Wall Street, New York City, upon property owned by John Jacob Astor, of London.

At an estimated cost of from $2,500,000 to $3,000,000 a mercantile structure is planned for the south western corner of Seventh Avenue and West 39th St., New York City., No architect has yet been decided upon for the work.

Housing the Workers—An Unfinished Job

By George Gove in "The American City"

THE abandonment by the Federal Government of the major part of the war housing programme, for which $195,000,000 was appropriated by Congress, presents to several American cities a serious problem and, simultaneously, an unprecedented opportunity.

It now seems assured that few of the industrial housing projects planned or under construction will be completed by the Government. Of approximately eighty projects planned, not less than fifty must be abandoned in their present condition, as planned or partially completed, if Congress carries through its programme of delimiting Government war expenditures, as now proposed in a joint resolution before the Senate. If these housing projects are abandoned, several industrial cities, in which the housing problem was serious even prior to the war, whose expectations and hopes had been raised by the allotments of Government funds for housing purposes, will experience disappointment. Morover, several of these cities will be confronted with the duty of determining what shall be done with large tracts of land acquired by the Government at condemnation value, on which town planners and architects have worked for weeks or months, and on which contractors have already been engaged at grading, excavation and construction. Are these communities to permit such projects to be left as they are, to become part of the war's inevitable junk heap, or will they seize the initiative now, assume the burden which the Government relinquishes, and carry forward to completion their own housing projects?

It will be remembered that the Government housing programme was undertaken very late in the prosecution of the war. By last July the Ordnance Department of the Army had undertaken the construction of sixteen projects, mostly of temporary and emergency character, because of the temporary nature of the munition plants served. These temporary houses, usually located in isolated districts, were built by munition manufacturers, who acted as agents of the Government. Such projects, now completed for the greater part, have become integral parts of the plants which they were intended to serve.

The Emergency Fleet Corporation, with a Congressional appropriation of which $75,000,000 was available for housing, had made a good start by July in a dozen places and is now approaching the completion of its entire programme. In the financing of these developments the shipbuilding corporations to be served were permitted to furnish about five per cent. of the funds and will acquire ownership of the completed developments by amortizing the remainder over a period of from ten to fifteen years.

The ultimate ownership of all emergency fleet developments will be vested in the corporations in which the tenants are employed. This is likewise true of the so-called ordnance developments. But the question of ownership of the developments created by the United States Housing Corporation, many of which were designed to serve not one but many industries and were located not in isolated villages but in large and growing industrial cities, was not determined by any action of the Housing Corporation and is still to be decided by Congress, which reserved the right to dispose of the properties by a specific clause in the appropriation bill.

The United States Housing Corporation, in the Department of Labor, began in June with an appropriation of $60,000,000, which was soon followed by an additional appropriation of $40,000,000. This fund was allotted to about eighty cities, a few being "ordnance towns" then uncompleted, but the majority being located in industrial cities of considerable population. Many of these plants, converted to munition manufacture from a peace-time production of large volume and wide diversity of products, are now rapidly resuming their normal pre-war functions, looking to a normal peace-time expansion. In many of these cities congestion and inadequate housing were a problem before the war. Unless these cities contemplate a recession of industry and a population decline sufficient to place them below the rank which they had attained prior to the war, the need for housing will not be less to-morrow that it was yesterday. Few industrial cities expect such a decline. With the cancellation of war contracts and the inevitable but temporary slowing up of production during the period of adjustment, there will be a necessary shifting of labor and a release from the congestion of the past year. But it is certain that the industrial cities in which industry prior to the war was growing in volume and diversity, in which there was normally a healthy growth and population increase, normal increase after the war will present again, if indeed it does not now, the problem of inadequate housing for the workers. In such cities it is a question if there can be a surplus of good houses available for workers and their families at reasonable rents.

In the event that Congress decides to abandon the projects planned and carried to partial completion in these cities, the immediate challenge to these communities is obvious. Will the Chamber of Commerce or some other organization representative of the community devise a plan for locally financing the prosecution of the housing programme?

Prior to the war several American cities had undertaken the solution of the housing problem on their own initiative. Bridgeport, Conn., Kenosha, Wis., and other cities had created independent housing corporations, operating without profit and wholly in the public interest, and these corporations were already launched upon an extensive programme of city building when war was declared. Bridgeport, through the initiative of the Chamber of Commerce, by creating such a corporation, invested approximately $1,000,000 in model homes for workingmen. Such limited dividend corporations are now admirably suited to undertake the solution of the housing needs of these communities now and for all time. By the revolving of the housing fund, present projects may be completed and future development assured. Moreover, such corporations, operating in the public interest, offer for the first time in this country a practical agency through which may be developed a workable plan for conserving the increment in property values and applying this increment to the betterment of the development and of the community. One of these corporations is now at work upon such a plan, the consummation of which will mean much to the community and to all communities which have been struggling with housing difficulties in the past.

Congress is now deciding which of the Government housing projects will be completed, and which will be abandoned. Later, a decision will be reached regarding the disposition of all projects, completed and uncompleted. Whether these decisions will safeguard the best interests of the communities involved it is impossible to predict. It is apparent that Congress is committed to no policy now, and the presumption is justified that Congress will be receptive to any plan of a practicable, business-like nature which possesses reasonable merit. Because of the emergency justification of Federal housing, the variety of projects undertaken, the different stages of completion of many of the projects and the different policies which have prevailed in the several Government housing agencies, it is unlikely that Congress will interest itself in the elaboration of any forward-looking plan whereby the present housing may form the nucleus of an enlightened housing programme for the future. The present situation points to but one prospect. When the ownership of these projects passes from the Government it will pass to agencies of a kind which have heretofore operated in the realty and investment field, adequately financed to undertake a large operation. If this prediction is justified, the present situation offers an unprecedented opportunity for speculative enterprise. One of the possible conditions of the transfer of this property provides for the writing off of the actual war cost as represented by increased cost of labor and materials. It is proposed to accomplish this writing off by fixing the value of the Government housing properties by appraisal five years after the war.

If the conditions of transfer prove attractive to speculative enterprises, how much more so should they be to the organized public agencies in the community. With land acquired by the Government at a condemnation of value, with access to town plans and architects' drawings, on which a large investment has already been made by the Government, with material bought and delivered and a project well started and available at a pre-war cost, what community will lack the initiative to carry through its own housing programme? What chamber of commerce, in any city in which allotment for Government housing has been made, will fail to undertake the work which the Government cannot now prosecute? And there are many other cities to which no Government appropriation has been allotted, where limited dividend corporations could now promote housing developments urgently needed for the expansion of local industries.

With plans formulating for the resumption of public works on a large scale, and for providing work for the unemployed during the readjustment period, the time for action is at hand. Here is an opportunity and an obligation which chambers of commerce cannot afford to reject.

Easier to Prevent Fires Than to Extinguish Them

FOLLOWING a comprehensive survey of the civic and industrial conditions and needs of Albany, N. Y., the Reconstruction Committee of the Chamber of Commerce of the city made a series of recommendations which included a thorough study of the housing situation, and the adoption of practices that would make for a reduction in the fire loss, the committee wisely asserting "it is easier to prevent a fire than to extinguish it."

Whenever intelligent thought to the fire hazard is given the conclusion is inevitably reached that the most effective means of preventing loss lies in the erection of fire resistive buildings, or in the equipment of those already built with such protective devices as alarms, automatic sprinklers, wired glass, metal window frames, and the like. While the initial cost of such equipment may seem high, and is in comparison with inferior substitutes, in the long run the investment will prove a financially profitable one, while the owner or tenant at all times has the comforting assurance that the menace of fire is remote.

Housing Legislation for New York State

FROM a programme of suggested activities in New York State prepared by the City Club of the Metropolis we extract the following, dealing with housing legislation:

The Need.—Adequate housing for all classes in the community, including that receiving the lowest wage, is essential to national efficiency, prosperity and well-being. The heavy costs of labor turnover, industrial unrest and disorder, and impaired health and efficiency, all of which affect not only labor but society as a whole, are in no small measure due to the improper housing of the wage-earner of limited means. This fact our experience in the war proved conclusively.

Hitherto the commercial builder has not supplied proper houses in sufficient quantity available at low rents, and there is no prospect that such a supply will in the future be forthcoming. Other sources of supply, in comparison with the need, are insignificant. The almost total cessation of commercial building of houses during the war has made this need at this time unusually acute.

The Remedy.—The fact that our previous efforts to obtain adequate housing in this country have failed can no longer be ignored, but it may be doubted whether we agreed upon the remedy Before the war our public authorities limited themselves to the prevention, in some measure, of the erection of unfit houses; while all the other progressive countries of the world endeavored also to increase the supply of good housing of the type most needed, and spent or lent at low rates of interest public moneys to that end. This latter policy our National Government adopted as a war measure by building houses, in some cases, for its munition and shipbuilding workers. Shall we not in this state adopt and extend the same policy as a peace measure? If so, shall it be done by the state or the municipalities? What machinery shall be framed for these novel undertakings? What standards for these houses shall be adopted? How shall they be enforced? Must extra precautions against the erection commercially of unfit houses also be adopted? The safest and, indeed, the quickest way to settle these and many similar questions is for the state to appoint a commission to investigate and report on the matter. In so doing, the Legislature may well follow the course pursued in the zoning of New York City and appoint a commission of citizens representative of all the varied interests involved, adding in this case, perhaps, a few legislators. It is because this method is at once so scientific and so democratic that it has proved to be so just and so practical.

Surplus Building Material Held by Gov't

ACCORDING to late estimates the Government now has on hand surplus building material, which it desires to dispose of, as here noted:

Brick, 14,516,000; hollow tile, 2,235,403; cement, 115,523 bbls.; lime, 77,560 bbls.; flue linings, 29,226 lin. feet; metal lath, 1,122,313 sq. feet; wood lath, 2,695 m.; wallboard, 5,406,429; roofing, 202,208 rolls; building papers, 52,377 rolls; nails, 159,622 kegs; reinforcing steel, 3,000 tons; sewer pipe, 577,407 tons; wood shingles, 908 m.

It is the policy of the Government in the sale of supplies to consult representatives of the industries concerned whenever sales are to be made in volume likely to disturb trade conditions.

Building Operations in New York State

ACCORDING to official reports, building operations in the first and second class cities of New York State in the month of November last amounted to less than $3,000,000, or $2,826,717, to be exact. In the same months of 1917, 1916 and 1915 the figures were respectively $8,000,000, $12,000,000 and $18,000,000. The cities of Buffalo and Troy reported greater building activity in November, 1918, than in the same month of the previous year.

Canadians Alert to the Fire Menace

AMONG other measures advocated by the Dominion Fire Prevention Committee of the Canadian Manufacturers' Association were the enactment of legislation "fixing personal responsibility for fires occurring after failure of the owners to comply with the requirements of inspectors appointed or authorized by the Government," and "the wider adoption of automatic sprinkler equipment."

Building Activity at Norfolk, Va.

THERE is probably more building activity going on in and about Norfolk, Va., at the present time than in any other section of the country The Federal Government, it is reported, plans the erection of a number of structures, the cost of which will reach close to forty million dollars once they be completed. All work is of solid masonry construction and of a desirable character.

O. F. Merrill is the engineer in charge of the erection of the reinforced cold storage building planned for the Merrell-Soule Company of Syracuse, N. Y. The contract for the work has been given the Turner Construction Company, of New York.

Importance of Proper Fire Doors

ALTHOUGH fire doors constitute one of the most important parts of building equipment, says "The Protection," purchase of them usually receives scant attention from the building owner. This matter is usually left by the owner entirely to his architect, or the fire door job is bid on not as a separate piece of work but with the carpenter's figures. Too many times the architect and contractor are interested only in getting such fire doors as will "get by." It is said by fire door contractors that at least 75 per cent of the architects do not understand underwriters' requirements for fire doors and will not consult underwriters to learn. Instead of specifying exactly what type of door shall be used at each particular opening, the architect calls for bids on "standard" fire doors. Standard is a term which may mean a great many things. It may mean that the door is to comply with the state or city building code only; it may mean that the door is to comply with the underwriters' standard in addition; it may or may not mean that underwriters' approved hardware is to be used in hanging the door. These and numerous of the word "standard," which interpretations must be made by bidding fire door contractors, cause bids to be made by different firms upon the expectation of furnishing entirely different equipment.

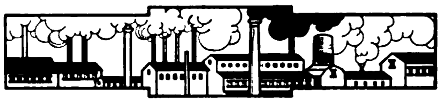
Price Instead of Quality Sought

In nearly every instance, even where the architect's spicifications for fire doors are extremely indefinite, bids on fire door jobs are almost invariably given to the lowest bidder, without any consideration of quality in material or workmanship to be furnished. The consequence is that each fire door contractor is liable to base his bid on what he thinks will be the minimum expenditure which will enable him to put in doors which will be passed by the inspectors after they are hung instead of bidding on the type of fire door which would be best suited for each particular situation. The fire door contractor cannot be severely censured for this practice. Since quality and workmanship are not considered, he must quote price to get the job. He dare not go over the head of the architect or contractor to the owner himself to point out the desirability of purchasing better or more suitable goods because much of his future business depends upon retaining the good will of the architect or contractor on the work. The result is as always, when price is the first consideration, that the fire door contractor tries first to get the job, and secondly to make some money out of it. Nearly every fire door contractor would be glad to bid on definite specifications if he had the opportunity.

When the architect or contractor has got his low price, he can expect work to be done in keeping with it. Few architects or contractors will know that under the underwriters' requirements two ply fire doors may be used on stairway and elevator shafts for protection, but that three ply doors are required on fire and division walls and for fire cut-offs and boiler rooms. Neither do they know that through bolts should be used in hanging tin covered fire doors instead of expansion bolts. The fire door contractor having bid on indefinite specifications probably puts in two ply fire doors everywhere, uses expansion bolts, does not use underwriters' hardware and the architect does not know the difference until he is informed by the insurance inspector after the work has been completed.

Architect Not a Universal Expert

Much has been done in recent years to bring about greater efficiency among architects in the handling of fire protection problems. But every building owner and prospective building owner should remember that no architect can expect to qualify as an expert in every phase of building construction. If it is true that seventy-five per cent of the architects do not have the knowledge and information necessary to draw up definite and clear specifications for fire door requirements, then the owner should deal directly with the fire door contractor and not through an architect or a carpenter. The man who is building should pick out a fire door contractor in whom he has confidence and ask his advice on the kind and quality of door which is most suitable for each particular opening to be closed. The owner should ask for suitability, quality and workmanship. Costs may be a litle higher in the beginning but they will assuredly be lower in the end. The least that a builder may do in justice to himself is to insist that his architect shall be thoroughly familiar with underwriters' requirements and state building codes and then draw up definite fire door specifications for each opening if the architect expects to accept the lowest bid received. Only in this way can the builder expect to get fire doors best suited in quality and workmanship to the location.



Warning Against Film Danger

A STRONG note of warning in regard to the storage of moving picture films is sounded in a preliminary report by engineers of the National Board of Fire Underwriters, who investigated the fatal fire and explosion which occurred in Pittsburgh on January 7. Upon this date, the seven-story Film Exchange Building at 804 Penn avenue was wrecked, ten people were killed and twenty others injured, many of them seriously. The explosion was of terrific force, the back wall of the first three floors, two bricks thick, being blown across an eight-foot alley.

The National Board engineers report that "practically all recognized safeguarding features in connection with the storage of film were utterly disregarded." For example, vaults having double doors were provided, but the doors were left wide open; there was no extinguishing equipment; the important requirement of vents for removing the dangerous gases of decomposition was complied with in a purely nominal manner, some of the vaults being vented *directly into the building,* or into shafts that were too small or that were closed at their upper ends. Furthermore, large quantities of film were kept outside of the vault.

On one floor, employes slept and cooked in the same room where naked reels of film were exposed, and it is rumored that smoking was indulged in. There were unprotected steam radiators throughout the building; the use of metal containers for the reels of film was largely disregarded; there were no fire escapes, and the stairways were not enclosed. These open stairways permitted the extremely rapid circulation of the gasses of decomposition to all parts of the building. While most of the floors were devoted to the storage of film, the sixth floor was occupied by a manufacturer of ladies' clothing. A large number of the girls employed in this factory were either killed or seriously injured, since their escape had been cut off by the mass of flame spreading up the stairs.

The engineers report that the fire probably originated upon the third floor and that the building quickly became filled with inflammable gases which spread through the stairways. Explosions of these gases ignited films upon other floors, the most serious explosion occurring on the second floor. The report says, *"conditions as serious as those existing in this building before the fire are present in practically all of the large cities of the country. There has been little legislation in regard to eliminating the hazard and even less enforcement of betterments."*

As to the remedies suggested, the report says:

"The elimination of the use of the inflammable nitrocellulose film is the logical solution to the question of reducing this serious hazard. The enactment of laws prohibiting further printing of motion pictures upon nitro-cellulose film should be inaugurated, but such prohibition will not remove the hazard which will exist for many years from the present stock of nitrocellulose film, and in order to avoid other disasters, it will be necessary to enact and enforce adequate provisions covering nitro-cellulose motion picture film.

"The essential features of such legislation follow:

"First—A reduction in the amount of inflammable film exposed to the minimum consistent with the actual operation of the business. This would prohibit the leaving of film exposed on racks and tables in the various rooms of the exchange, and would require rigid inspections on the part of the fire department to assure good housekeeping by the employes of the exchange.

"Second—The prohibition of the handling of such film or its storage, except in rooms and vaults adequately protected by automatic sprinklers. The nature of the product requires vaults to be equipped with at least one head to each 800 pounds of film.

"Third—The requirement that all film of this nature be stored in vaults of fireproof construction, with an ample vent opening from each direct to the outside of the building and, preferably, extending to the roof; all doors to be of a type which can be readily opened and closed, and normally to be kept closed."

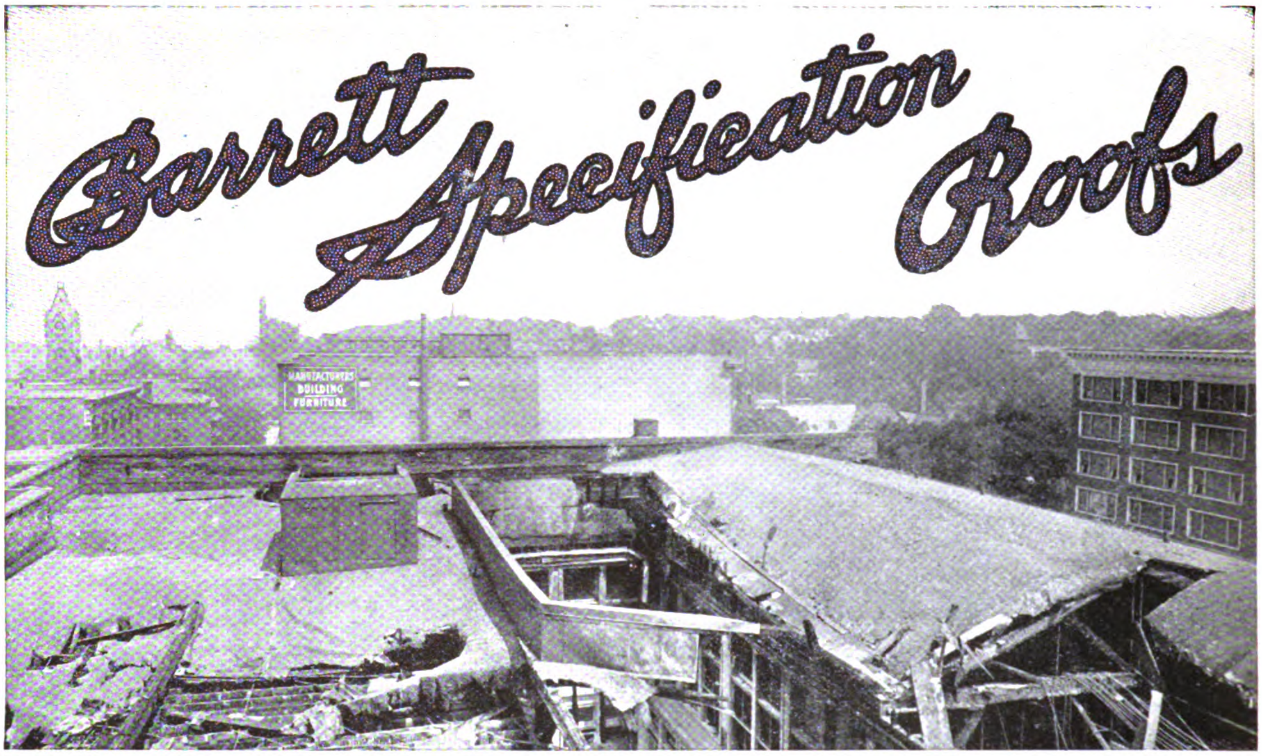
To Build Concrete Warehouse

A HUNDRED thousand dollar plant will replace the cotton compress which, with two thousand bales of cotton, was destroyed by fire several weeks ago, at Moultrie, Ga.

Work will begin within the next few weeks and the new compress will be ready for service before the next cotton season begins. A six-unit bonded warehouse will be added to the plant. These units will have a storage capacity of more than a thousand bales each. The warehouse is to be built of concrete and an automatic sprinkling system will be installed.

Fire Losses in East Orange, N. J.

Fire losses of $20,677.25 reported by Fire Chief George L. Mitchell for the past year in East Orange, are lower by $9,779.50 than in 1917. The figure ranks among the lowest on record for the city. The biggest loss of the year is placed at $8,000 for the fire in September that destroyed the Rollo Rink in Halsted Street. The efficiency of the department, the chief says, is preventing fires from gaining headway. He points out that the value of property exposed to danger where fires have occurred, exclusive of contents, amounted to $929,400.



Ashton Building, Grand Rapids, Mich. Gen'l Contrs: Campbell & McNabb, Grand Rapids, Mich. Roofers: F. J. Sokup & Co., Grand Rapids, Mich.

Why the Underwriters approve Barrett Specification Roofs—

Photo above shows the roof of the Ashton Building in Grand Rapids after a recent fire.

The building carried a Barrett Specification type of roof which served as an air-proof fire-blanket—**and served well!**

A report of the fire states that the firemen played two heavy streams on this roof for two hours while the fierce fire raged in the upper stories.

Yet the roof did not burn and only succumbed **where the destruction of the roof boards and beams brought about a complete collapse of the support.**

In fire that twisted steel and melted copper, the roofing only smoked, softened and cooked; but it did not blaze or furnish fuel to the flames!

Notice how strips of it hung on the rafters where flames could attack it edgewise, and yet it was not consumed!

No wonder the Underwriters Laboratories put Barrett Specification Roofs in "Class A" and accord them the base rate of fire insurance!

20-Year Guaranty

We now guarantee Barrett Specification Roofs to last for twenty years without cost for maintenance. The guaranty is a Surety Bond issued by one of the largest surety companies in America, the United States Fidelity and Guaranty Company of Baltimore. It is offered on all roofs of fifty squares and over in all cities in the United States and Canada of 25,000 population and more, *and in smaller places also where our Inspection Service is available.*

A copy of the Barrett 20-Year Specification, with roofing diagrams, sent free on request.

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LATEST EDITION

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New York City, N. Y., January, 1919

Priceless

Decrease in Steel Earnings

With the cessation of war business the earnings of the great steel manufacturers of the country have fallen off notably, and a further decline may be looked for before an upward trend sets in with the resumption of building activity. In the three months ended December 31, 1918, the net earnings of the United States Steel Corporation, after tax deductions, were $36,354,165, as against $42,961,689, for the preceding quarter, or a drop of over $6,600,000. Because of this falling off in income the extra dividend paid upon the stock for the quarter was cut from 2 to 1 per cent; though the regular dividend of 1¼ upon common and 1¾ upon preferred stock was ordered.

A cut in the per share earnings of the Inland Steel Company for 1918 is shown in the report for that year just issued. Whereas the net profits, after deducting taxes and charges, in 1917, were equivalent to $42.14 a share on the $25,019,500 capital stock outstanding, the rate for 1918 was only $25.60 a share.

The net earnings for 1918 aggregated $14,473,512, against $21,240,783 in 1917, and the net profit, after the deduction of depreciation, interest, Federal taxes, etc., totalled $5,166,549 for 1918, against $10,535,068 for the previous year, a drop of more than 50 per cent. Dividends for 1918 were changed but little, and the surplus as the result of the year's operations was $3,165,189, against $8,535,248 for 1917.

The net earnings of the American Brass Company for 1918, are shown to have been $3,992,219, as against $7,109,177 for the previous year and $10,991,669 reported in 1916. Heavily increased operating expenses, and especially wages, was responsible for the decline in the earnings. The assets of the corporation at the close of 1918 were $47,970,361.

Davenport Ordinance Compels Use of Sprinklers

Davenport, Iowa, is a city of approximately 50,000 inhabitants. The city recently adopted a complete and modern building code which, among other requirements, calls for the installation of automatic sprinklers in buildings housing a number of occupancies. Building Commissioner Ralph Graham has compiled and edited the code which has been published in book form. The section defining (by occupancy) the buildings which must be protected by a sprinkler system is here given.

Description of Occupancies

"The following existing buildings and those hereafter erected or reconstructed for purposes herein mentioned shall be equipped with an approved automatic sprinkler, as otherwise provided.

1. Non-Fireproof Stables. Three or more stories in height, if occupied in part for living rooms for one or more families.

2. Non-Fire Proof Cold Storage Warehouses. Six (6) stories.

Area and Employes Considered

3. Buildings Used for the Sale or Manufacture of Combustible Merchandise, Excepting Department Stores. All non-fireproof buildings, other than those hereinbefore specified, six (6) stories or more in height, where more than one person for each one hundred (100) square feet of floor area on the third or fourth floors, or more than one person for each one hundred and fifty (150) square feet of floor area on any floor above the fourth floor, are employed; and in the basement and sub-basement of all non-fireproof buildings, three (3) or more stories in height, used wholly, or in part, for the purpose of the sale or storage and manufacture of merchandise, excepting department stores, when such buildings cover a ground area of over four thousand (4,000) square feet; also, in all fireproof buildings eight (8) or more stories in height, used for the storage, sale or manufacture of combustible merchandise, where more than two (2) persons for each one hundred (100) square feet of floor area on any floor above the fifth, are employed; and further provided that a sprinkler equipment shall not be required above the basement floor in any building where stairways and elevator shafts are bricked up, and openings have fire doors or windows.

Exceptions for Superior Construction

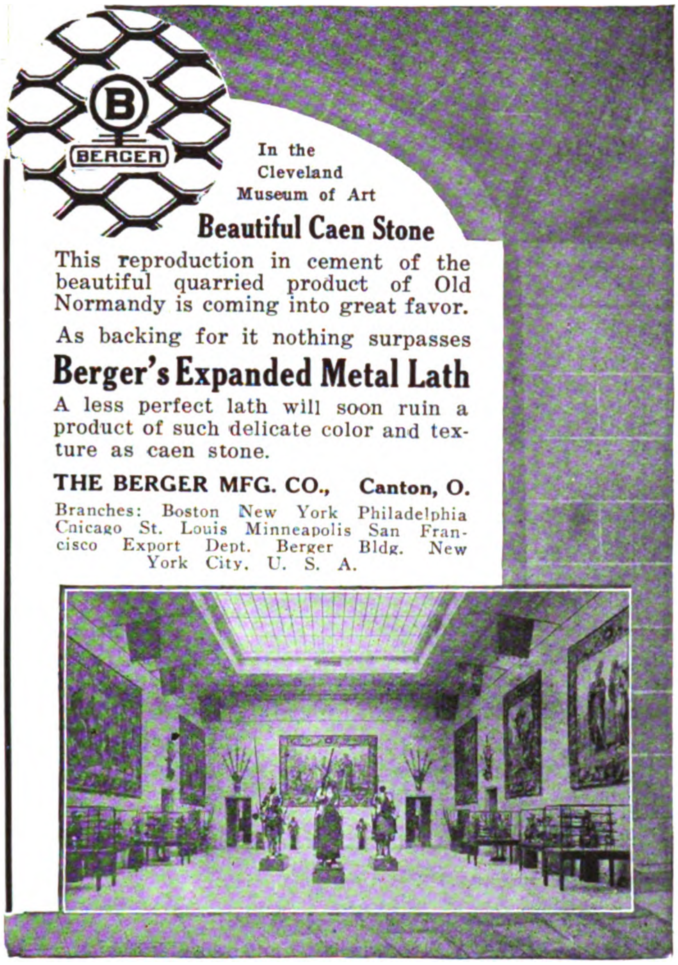
4. Office Buildings, Club Houses, Providing Sleeping Acommodations for Less Than Twenty (20) Persons.

(a) All rooms in basements and cellars used for storing combustible material; provided, however, that sprinkler systems will not be required in safety deposit vaults and other vaults for the storage of records, files and other documents which would be subject to material water damage in case of the accidental discharge of a sprinkler head.

(b) In all rooms in basements and cellars of non-fireproof buildings used for restaurant kitchens or boiler rooms, provided that sprinklers shall not be required in boiler rooms and rooms used for the storage of coal, if such rooms are enclosed by brick walls, having automatic or self closing approved fire doors on opening.

(c) Around all stairs and elevators in basements and cellars, unless such stairs and elevators are enclosed in masonry or incombustible walls, having approved self-closing or automatic doors on openings; provided, however, that sprinklers or automatic doors will not be required on exterior stairways, or on interior stairways leading up to safety deposit vaults and other similar premises which are separated by fireproof walls from the other

(Continued on page 167)



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Plan to Aid Home Builders

Aid to home builders on a national scale and in a manner similar to that by which the Federal Farm Loan banks aid agriculture has been suggested to the Division of Public Works and Construction Development of the Department of Labor by President Kessler of the United States League of Building and Loan Associations in order to interest the public in building during the transition period from war to peace.

Building loan associations of this country, according to this plan, would perform for workingmen much the same service as that performed for farmers by farm loan banks. Mortgages made over to building and loan associations, it is suggested, should be rediscountable at Federal Reserve banks, in order that these associations might render most effective service. At present, however, two difficulties stand in the way. First, the associations are not members of the Federal Reserve Bank system and have no capital stock and reserve therein; second, the reserve banks are designed for handling commercial paper, not mortgages.

The solution of the first problem suggested is that special measures be taken to protect the reserve banks and that the second be met by limiting the amount of mortgages rediscounted. As an alternative it is thought that the Farm Loan banks might be authorized to accept mortgages on homes as well as on farm lands. Either method, it is thought, would be preferable to the creation of new organizations.

The building loan associations are admirably equipped to finance home building, and it is believed that they can assist greatly in private home building, which is needed now to relieve congestion.

Now

For a Forward

Move in Fireproof

Building Material

Davenport Ordinance Compels Use of Sprinklers

(Continued from page 165)

portions of, or rooms in the basement premises which are hereinbefore required to be equipped with sprinkler systems.

To Protect Human Life

5. Hotels, Club Houses, Lodging or Rooming House Purposes, Where Such Building Has Sleeping Accommodations for Twenty (20) or More Persons.

(a) On all floors and basements, if non-fireproof buildings more than two (2) stories in height and having an area of more than six thousand (6,000) square feet, excepting reading rooms, smoking rooms, gymnasiums, and except hallways containing stair or elevator shafts enclosed with combustible or fireproof material.

(b) Sleeping rooms above first floor which are arranged in stalls, the partitions of which do not extend to the ceiling, are not exempted by the provisions of the previous paragraph.

6. Parish Halls, Lodge Halls, Dance Halls, Banquet Halls, Skating Rinks, Assembly Halls.

Which are used regularly for theatrical purposes shall have sprinkler system installed in all parts of building used for this purpose except in the box office and auditorium.

7. Moving Picture Theatres, Vaudeville Shows, Where an Admission Fee is Charged and Regular Performances Are Given.

Building of ordinary construction more than two (2) stories in height. If buildings for these purposes the sprinkler system shall be installed in all the rooms of that part of the building used for the purpose as listed in this paragraph, except in the box office and auditorium.

Places of Assemblage

8. Public Theatres, where an admission fee is charged and movable scenery is used, assembly halls seating three hundred (300) or more and containing a permanent stage and regular theatrical vaudeville is staged shall have sprinkler systems.

In all rooms except box offices, auditorium, toilet rooms, offices, and space over auditorium, provided no combustible material is stored or kept in said space.

Provided, however, that public halls and club halls with a seating capacity of less than six hundred (600), although occasionally used for theatrical presentations shall not be construed to be public theatres within the meaning of the term, notwithstanding the fact that movable scenery is used upon the stages thereof on such occasions and such public halls and club halls shall not be classed as "theatres" or "assembly halls," as defined in these paragraphs.

9. Tenement and Apartment Buildings.

More than two (2) stories in height and containing more than six (6) apartments, sprinkler systems shall be installed in the basement or cellar, including the floor of the first floor above the basement or cellar, shall be of fireproof construction. Buildings divided into units of not more than six (6) apartments, each by a standard masonry dividing wall extending from the basement floor to a point three (3) feet above the roof and in which all openings were equipped with approved doors are exempt. In buildings of ordinary construction, more than three (3) stories and containing more than twelve (12) apartments in existence at the time of the passage of this code, sprinkler systems shall be installed in the basement and all partitions in such basement are protected by a covering of three coats of fire-resisting plaster, or metal lath.

10. Department Stores.

More than three (3) stories in height, and those buildings two (2) stories in height which contain more than seven thousand five hundred (7,500) square feet of floor area.

Public Schools

11. School Houses and every building containing class rooms in special or general instruction, having seating capacity of more than fifty (50) people other than halls for the purpose of religious instruction.

In all rooms, in basements of non-fireproof buildings, which are two (2) stories or more in height and have an area of more than four thousand (4,000) square feet, except class rooms, assembly rooms, gymnasiums, auditoriums, dining rooms, museums, lavatories and reading rooms or book stack rooms, used in connection with reading rooms.

In addition to these requirements, "when three or more buildings used for stores, factories or warehouses, communicate by openings through separating fire walls, the openings shall be protected by double fire doors, and each building shall also be provided with a system of approved automatic sprinklers also serves to modify certain restrictions in the code relating to frame buildings."

Demand for Homes

A shortage of nearly 1,000,000 homes in the United States is indicated in a statement on building conditions formulated by twenty-five representatives of building and loan associations from almost every section of the United States, who recently held a conference in Washington. The statement, made public through the State Council of Defense, follows:

"In normal times, under normal conditions, it required the building of about 600,000 homes per year to supply the normal growth of the country, and replace the losses occasioned by fire and other destructive agencies. For the last two years, owing to causes growing out of the world war, this normal construction of homes has been practically suspended. What housing construction has been accomplished has been for the major part that which was demanded to meet war conditions. Shortage of labor and restrictions on the use of building material stopped the work.

"At this time there is a shortage of homes in America of nearly 1,000,000, to which must be added the normal requirements of the year just opening. Most of the present shortage has not been wholly abandoned, but has been merely postponed and delayed, and the pressure to inaugurate and complete this delayed construction will shortly be felt, as soon as weather and climatic conditions make such work feasible.

"The demobilization of the military and naval forces, now in progress, and the release of workmen from the ship building and munition plants and other war industries will furnish the supply of labor which has hampered building for the last two years, and this, together with the removal of restrictions on the use of material and transportation which so largely contributed to block the resumption of home building now possible."

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consistent presentation—in season and out—of your product in CONSTRVCTION cannot fail to result favorably because the success of this publication depends upon

(1) how well it advances and proves the argument for proper fireproofing

and

(2) what it actually accomplishes to increase the use of firesafe materials and devices.

The first objective is attained (intensively) through the editorial, news and advertising sections of CONSTRVCTION and (extensively) by sending the magazine over the entire country to all the business and professional interests related to building, planning, construction, equipment and maintenance.

The second purpose is accomplished by **actively fighting for legislation favoring firesafe construction** and against laws permitting the continued use of wood—and remember that no company can do this work as effectively as a publication, that the "fireproofing fraternity" at present is a composite unorganized body comprising a number of separate units representing more than a dozen industries, that there is practical need of a national mouthpiece such as you have in CONSTRVCTION, that **makers of fireproof materials are now getting but one per cent. of the business which ought to be theirs**, that advertising in CONSTRVCTION is helping yourself to get more orders, giving your goods the representation they deserve—and according this publication the cooperation it merits.

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If your dealer cannot supply you write the factory.

H. M. Reynolds Shingle Co.
"Originators of the Asphalt Shingle"
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Wm. Wallace Ewing, Consulting Eng.

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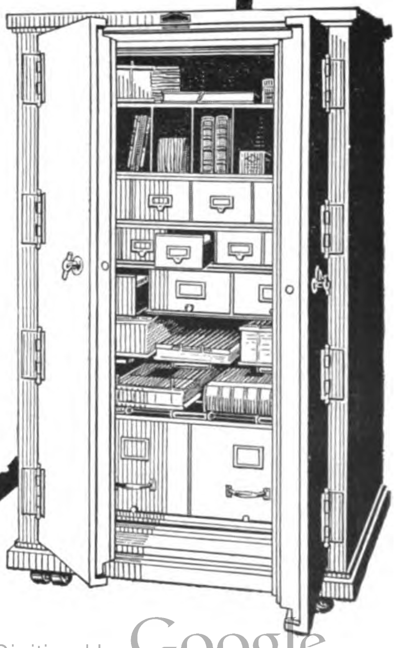

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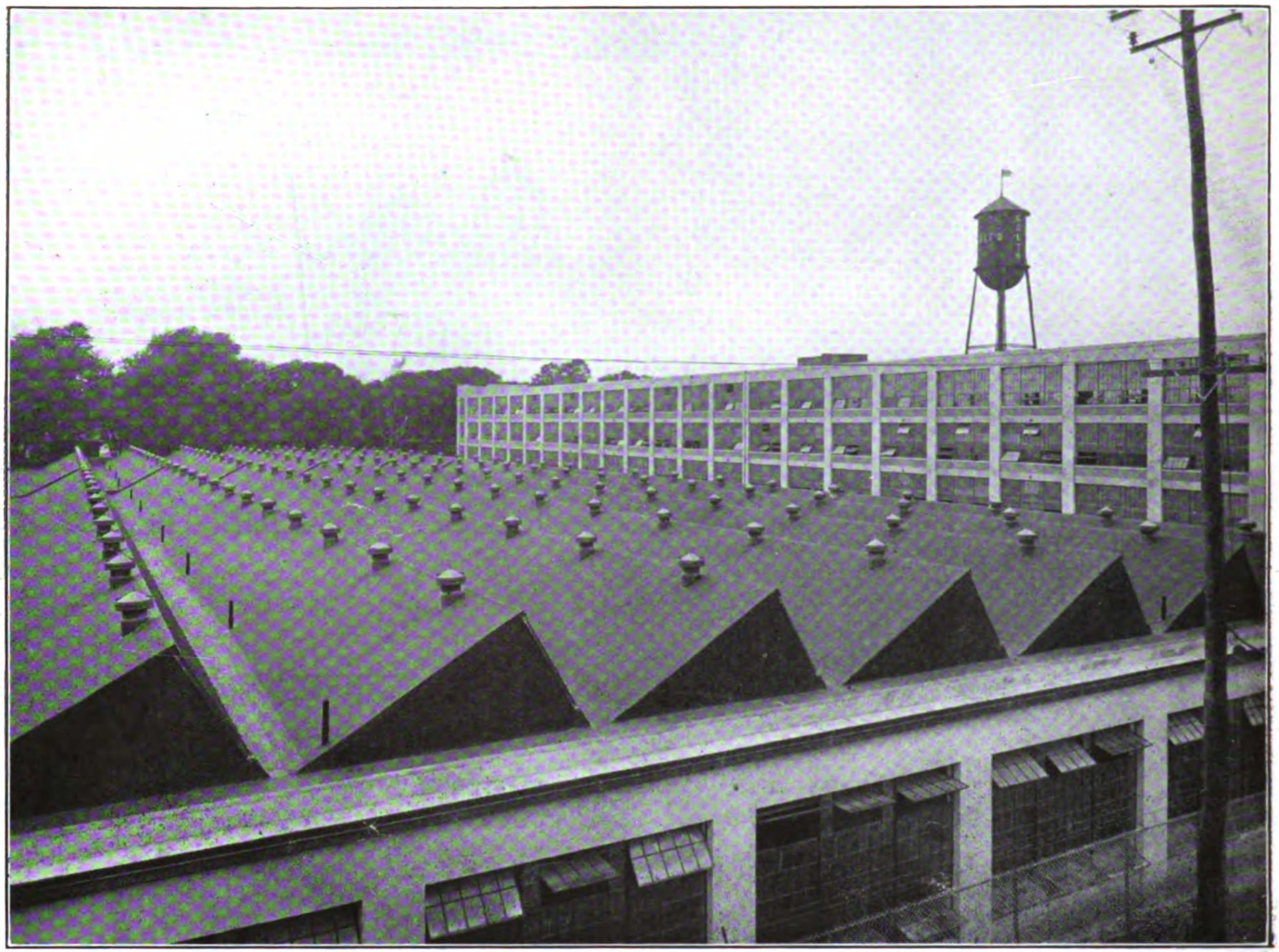

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VOL. VIII FEBRUARY, 1919 No. 2

Lumber Prices at High Level

THOSE who have been predicting a reduction from the present high prices of lumber, will do well to carefully note the following statement lately made by Horace F. Taylor, president of the National Wholesale Lumber Dealers' Association:

"The very clear majority of opinion we derive from representatives of the industry in all parts of the country, is in effect that there will be no further reduction in the cost of lumber for a long period, and that there is no safe ground, therefore, for postponing building in the hope of a price reduction in this material. We look upon the present rather quiet conditions as temporary only and due to industrial readjustment, soon to give place to every sound activity. The cost of making lumber offers no chance of reduction, both on account of materials and supplies, and the cost of labor which, it seems not only necessary but desirable to maintain at as nearly an adequate rate as possible in view of the present cost of living. In addition to the ordinary increase in demand that is expected, an unusual call for lumber for export to Europe will soon begin to have its effect on the situation. Logging conditions during the present winter have been unfavorable, particularly in the North, and lumber production will apparently be less than that of normal years for some time to come. There is only one possible conclusion based upon the opinion of those consulted and that is that as far as the lumber market is concerned, the present is an advantageous time to purchase."

Frame Hotels Burn

THREE hotels and several adjoining cottages, all of frame construction, were destroyed by fire at Asbury Park, N. J., on February 23rd. Once ablaze the buildings burned quickly, the firemen being unable to save any portion of them, despite the fact that a heavy rain was falling at the time.

Asbury Park is one of the most attractive of the North Jersey seaside resorts, being well laid out and its thoroughfares kept clean and in a high state of repair. For the most part its buildings—save those in the mercantile section, are of frame construction; with wide porches and the deadly wood shingle roof; the whole presenting an inviting field for fire. It is just two years ago that several blocks at Asbury Park were burned in a fire that for a time threatened to wipe out a considerable part of the city, and was only stayed through a fortunate change in the wind, and the resistance offered by a brick church with a slate roof. So long as frame-built communities exist just so surely must we expect to hear of serious fires.

15,000 Lives Lost in Building Fires

NO less than fifteen thousand lives were lost in building fires in the United States during the past year. Doubtless a still larger number were badly injured through the same cause; though no reliable statistics are available in such connection.

What a severe arraignment the record presents as to the inadequacy of our state and municipal building codes governing the erection and maintenance of structures in which human beings are forced to congregate.

In these days when fire-safe building material is available at no greater cost than inflammable wood, and architects and engineers are thoroughly equipped to plan and contractors to erect properties that would be virtually immune from the fire menace, municipal authorities that permit the continued erection of structures that take an annual toll of 15,000 lives needlessly, have much to answer for, and an aroused public conscience some day will demand a reckoning.

In 1918 the total loss from fire in Tampa, Fla., was $210,000. For the same period 709 permits were issued for the erection of new houses or the repairing of old ones, the aggregate cost of which was $383,397.

Condemn "Three-Decker" Wooden Dwellings

URGING the passage of a bill offered in the Massachusetts Legislature recently based upon the report of the City Housing commission of Boston, witnesses condemned the "three-decker" wooden dwelling as a menace to life.

The bill prohibits the erection of multiple dwellings three stories in height, except they be of first or second-class construction anywhere in Boston, thus extending the provision to the sections not now covered by the law controlling the areas within the building limits.

Matthew Sullivan, a Boston architect, produced figures to show that a second-class building may be erected nearly as cheaply as wooden structures by using the exterior walls at the corners to supply two sides of the chimneys, thus cutting the cost of the chimneys in half.

Chairman Charles Logue of the Housing Commission pointed to brick buildings directly across the street from where the committee was in session stating that these structures were probably seventy-five years old. He said that their chimneys are so constructed as to utilize one of the partition walls as one side of the chimney.

Assistant Corporation Counsel Joseph P. Lyons of Boston said the bill had the approval of Mayor Peters.

Chairman Logue said the bill is favored by the Chamber of Commerce and the principal argument in its favor is the element of hazard, the three-decker being a distinct fire menace. While the first cost of a building of second-class construction might be greater than the wooden structure, the line where a saving begins is soon crossed through the smaller cost of upkeep of the brick structure. He cited the conditions in Salem and Chelsea where large sections of the city were burned because of the large number of wooden buildings there. He did not think that the law would discourage the building of three-story dwellings.

Mr. Logue did not think the requirements of second-class construction would result in increased rents. He said that a brick house is far more valuable after ten years than a similar house built of wood The only one who makes money in the wooden three-decker is the speculator, he said.

J. Randolph Coolidge, Jr., of the Boston Housing Commission, also spoke for the bill. He characterized the wooden three-decker as a tinder box and said a building with brick exterior is far more safe in case of fires.

Building Commissioner Herbert A. Willson favored the bill and said that he has always been opposed to wooden three-deckers. He did not think that they are more economical for the poor. He said that these buildings are no longer allowed in Philadelphia or Baltimore. "There are places in Dorchester where people can shake hands from one bay window to another," he said, "and if a fire got started, there would be no stopping it."

An Incentive to Prompt Building

AS a practical reply to the assertion that building operations continue lethargic because of high costs of labor and materials, several prominent material manufacturing concerns have announced sharp reductions in the price of their products, and it is anticipated other institutions will follow suit. Notable among the manufacturers that have taken this forward step is the Flintcote Company, of Boston, manufacturers of asphalt-shingles and prepared roofings, and possessing country-wide distribution facilities.

The new schedule of prices issued by the Flintcote Company compares very favorable with that in existence in pre-war days: certain grades of material, in fact being cheaper today than they were two years ago.

In explaining the reasons that induced its action the Flintcote Company says in part:

We had several reasons for doing this. One was to have the shrinkage take place in our stock rather than in yours. A second was to allow you to have justified confidence in the stability of our prices. A third was to allow you to pass this confidence on to builders and owners who naturally want to know that prices are reasonably stable before they resume building. And last, but by no means least, was our sense of duty in connection with the present labor situation. If, because prices are not stable, you are not buying and as a result our factory is not in operation, we ourselves are not employing labor. Consequently, unless we did all in our power to stabilize prices, thereby helping to remove obstructions in the way of a resumption of general building, we would be shirking one of our "readjustment" responsibilities.

Another institution that has adopted the sensible price reduction plan of inducing the sale of its product is the American Radiator Company, which on January first announced a cut of twenty-five per cent upon its boilers, radiators and vacuum cleaners; all of which enter into building construction or maintenance.

The Peril of Our Public Buildings

SPEAKING before a recent conference between the Committee on Co-operation with the National Board of Fire Underwriters of the Fire Marshals' Association of North America and members of the National Board staff, Professor Ira H. Woolson, consulting engineer of the Board, upon "The Peril of Our Public Buildings" said in effect:

The majority of buildings are owned by individuals, companies or corporations. They are constructed and managed by their owners, and the loss of one with its contents has little public effect.

Certain buildings, usually owned by corporations, such as churches, colleges, clubs and hospitals, which are semi-public in character, have a direct relation to the social life about them. Their destruction would be a community privation, but the financial loss would fall principally upon the small permanently organized group of persons who created them.

There are other buildings, however, which are occupied and managed by public officials, such as state houses, court houses, city halls, libraries, school houses, county houses, and similar buildings erected with money raised by special tax; also Federal buildings, such as post offices, customs houses and others erected with funds appropriated by the Government.

The burning of a building of any of the types enumerated is nearly always a public calamity, as they house large quantities of legal records, public documents, rare books, and historical papers and relics, all of which are of great value.

The supervision of such buildings is usually vested in officials subject to the vicissitudes of politics. Such custodians, having no financial interest in the buildings, naturally possess limited responsibility for their preservation. This situation is further complicated by the fact that there are frequently several official tenants in the same building, each more or less independent and supreme in his own domain. It therefore often happens that the building superintendent (who is sometimes the janitor) is the only person well acquainted with all parts of a building. This individual is seldom qualified to render intelligent judgment upon the technicalities of fire hazards and proper methods for their removal. As a result of this absence of efficient personal responsibility, hazardous conditions sometimes exist for years unappreciated by the occupants of such buildings or the public, although they would not be tolerated a week in many privately owned structures in the same city. It is literally a case of "What is everybody's business is nobody's business."

Have Impressive Appearance

As a rule, the architecture of such buildings is of impressive, monumental character. They lend dignity to the municipality in which they are located, and are the pride of its citizens. They are well constructed with solid masonry walls; fire-resistive floors and roofs; high ceilings; massive windows; marble stairways; an elevator or two; large heavy panelled doors, and all the features which, to the untrained eye, constitute a "strictly" or "absolutely fireproof" building, and they bear that reputation.

When they burn, as they occasionally do, it is a puzzling surprise to the population. The fire is considered mysterious, and almost as much of a miracle as would be the burning of a stone pile. Usually the only mystery about the burning is that it had not occurred before.

The burning in recent years of the Houses of Parliament in Ottawa, Canada; the State Capitol of New York, and the Federal Customs House at Bangor, Maine, are typical examples of many which could be mentioned illustrating the weakness of this class of buildings.

In consulting some incomplete records, it is discovered sixty-four city and town halls were reported burned between March, 1914, and October, 1918. During the same period fires occurred in thirty-seven court houses, eight libraries, eight jails and fifteen miscellaneous public buildings. Some of these were absorbed in conflagrations, and would probably have been lost irrespective of the care taken to reduce the internal hazards, but many of the fires originated within the buildings themselves, and often the destruction was complete. The list merely indicates the frequency with which such buildings burn. The common causes mentioned were defective flues, spontaneous combustion, smoking, defective electric wiring, hot coals on floors, etc., down the usual list of carelessness.

The greatest danger in these buildings is the open connections through all stories. Commonly, there are two stairways, more being added in proportion to the size of the building; the principal grand staircase near the main entrance, the service stairways at the rear or sides of the building, and often there are small private stairways coupling affiliated offices in different stories. These stairways are seldom enclosed and, therefore, with the hallways, constitute a network of open channels throughout the whole building favoring rapid distribution of fire.

The stairs leading from the basement or cellar are commonly cut off by doors at the first story level, but this advantage is usually depreciated by an elevator shaft which is open in the basement story, and having artistic metal grills as its only protection in the stories above.

Sometimes small hand-operated book or document hoists will be found, also dust or waste paper chutes with an occasional ceiling ventilator from the top story rooms into the attic, which latter space is liable to be a repository for all sorts of inflammable material.

Like Some "Fire Fiend's" Planning

The number and variety of such communicating channels in some buildings would almost lead one to believe that some fire fiend had planned them with diabolical cunning to insure the complete destruction of the buildings if ever they get on fire. Some of the minor flues are frequently installed long after a building is erected, and were the brilliant idea of an occupant who thought only of convenience, and had no conception of the danger he was creating.

Another class of unprotected connections in nearly all such public buildings which, though usually out of sight are nevertheless dangerous, are the ventilating ducts, also warm air ducts if that system of heating be employed. These metal ducts cross the basement ceiling to risers which distribute throughout the building.

The basement is usually the storeroom for boxes, old furniture, surplus publications and other highly combustible material. A fire occurring in the basement is likely to escape discovery until it has gained considerable headway. If it becomes serious, the sheet metal ventilating and warm air ducts will get red hot, and although no flame enters them, the air within is superheated and distributed through the building, igniting everything combustible it touches

In addition to the basement serving as a storeroom, one is liable to find a carpenter shop or paint shop located there in which smoking is freely permitted. Carelessly installed heating devices for a glue pot, also a gas or oil stove, or other temporary heating expedients, are frequently in evidence. The housekeeping is liable to be bad, and the heating plant is occasionally only partially isolated. The conditions are right for a fire at any time.

Hazardous Conditions General

I am convinced that the conditions which I have described exist to a greater or less extent in all public buildings; certainly they exist in many of the large Federal buildings in Washington, and it is surprising that they have not burned.

It is quite evident that some pressure should be brought to bear to correct such evils. The National Board of Fire Underwriters is trying to do its part to prove the necessity for action.

Although the hallway floors of a building may be of tile or marble and the stairways built entirely of marble, stone or metal, with no combustible material about them, they are nevertheless a serious fire hazard because they act as flues to carry the hot products of combustion from a fire in one part of a building to another where combustible material is present. The danger of this method of fire transmission is little appreciated by those who have not studied it.

When air is heated to 1,000 deg. F. or over—which is a temperature quickly reached in most fires—it will ignite instantly everything combustible with which it comes in contact. The actual flames of a fire may extend only a few feet from the point of origin, but the hot smoke and invisible heat waves may easily travel through an incombustible stairway or hallway for fifty or one hundred feet and then ignite the whole surface of a wooden door in an instant. At the same time, glass door panels and fan lights will collapse by rapid expansion, and the intense heat entering rooms will cause them to burst into flames.

A Fire That Jumped Five Floors

An excellent example of this fact occurred two years ago in the Hotel Lenox in Boston. The fire started in a bed room on the third floor. The hot air passed through an open door and up through a stairway and elevator shaft of incombustible construction to the sixth story, and then travelled along the hallway until it found some doors left open by fleeing occupants. These rooms were burned out. At the same time it jumped from the sixth to the eleventh story, and burned out a few rooms in the same manner. The intervening stories were very little injured, except that in some cases there was surface burning of a small amount of wood trim in the hallways. This action of heated air is common, but a fire is not often extinguished in time to preserve the evidence so well.

It is surprising how small an opening through a wall or floor will suffice as a gateway for superheated air to start a fire on the opposite side.

In investigating a fire in a reinforced concrete building at Far Rockaway, L. I., we discovered that the fire entered the concrete building from an adjoining structure through a four-inch hole in the concrete party wall, and then passed to two stories above by way of two-inch holes in concrete floors where a heater pipe had been removed. At another place the hot air went through a one-inch hole in the party wall, and set fire to a wood pile!

A representative of the Canadian Fire Underwriters' Association has stated that from his experience he is confident many fires are transmitted through fire-resistive floors by means of super-heated air flowing through the small spaces surrounding steam and hot-water pipes. This opinion is undoubtedly correct. He does not consider the loose fitting metal collars ordinarily used to close such openings sufficient protection, and urges that some reliable form of fire-stopping be devised for such openings.

Dangerous electric lighting equipment frequently exists in public buildings, particularly if the installation was made some years ago before rules for such work were well established. It is also common practice for some clerk to cut in an extra light or two which will overload a circuit; and drop cords are allowed to become frayed and in condition to start a fire at any time.

The Safeguards Recommended

It is obvious that certain things should be done to safeguard properly these public buildings which are so important to the municipal and state life. They are:

1. A fire cut-off should be made between basement or cellar and first story by enclosing stairways and elevator shafts in the basement with fire-resistive partitions and installing fire-doors. The grade of such partitions should be suited to the character of the building; usually four inches of hollow tile or gypsum block, or metal studding covered with metal lath and plaster will be ample.

2. So far as practicable, enclose all minor stairways throughout the building with fire-resistive partitions and fire-doors. At least cut off such stairways in each story by fire-doors. It would probably be impracticable in most cases to enclose the main stairway, but at least one fire-resistive partition with fire-doors should be installed in each hallway in each story.

3. Enclose elevator shafts in all stories, and if it extends into the attic, as is usually the case, the top should be fully enclosed with fire-resistive construction.

4. Close all minor openings possible between floors, and arrange a self-closing trap controlled by a fusible link for others.

5. Isolate the heating plant by enclosing with masonry walls and fire-doors, and cover all ventilating and heating ducts in basement or cellar with at least one inch of cellular asbestos board or some equivalent. Wherever possible install an automatic sprinkler system to cover repair shops or other hazardous occupancy in the basement.

6. Require the installation of suitable fire fighting equipment; standpipes with a fifty foot length of one and a half-inch hose where practical, and always a suitable number of approved fire extinguishers.

7. Require an expert inspection of all electric equipment, and if necessary have repairs made.

8. Insure that suitable connections are made to notify the fire department promptly in case of fire.

9. Insist upon good housekeeping and proper disposal of refuse.

10. Public record should be made of hazardous conditions found, and recommendations proposed.

Public buildings of the class described exist in all states of the Union. They need the supervision of someone in each state competent to determine whether they possess serious fire hazards, and who would exert forceful influence to have them corrected if found. To my mind, the name of that person is "State Fire Marshal."

The best means by which the recommended fire prevention measures shall be procured in each instance must, of course, be left to the judgment of the person advocating the action. In most cases, where it is necessary to spend considerable money to protect a building, it is probable that the creation of public sentiment in favor of the work will be the only way to obtain results. If the public can be made to realize the menace to its own property and safety, it will secure the appropriation of money for the purpose.

Growing in Popularity

THE idea of converting old-fashioned frame stores or dwellings into thoroughly modern and decidedly attractive structures through the application of lath and stucco is rapidly gaining in popularity, and will continue so to do, as additional examples of transformed properties are completed. Many old-time buildings that were well regarded in their day, but fall far short of present standards, could at comparatively little expense be remodeled along artistic lines, and supplied with every convenience.

This type of work, as CONSTRUCTION has repeatedly urged, should appeal to architects and contractors at a period in which new building is far below the normal, and if attractive sketches and plans were drawn up, many a man could be induced to remodel premises, which he would not dream of demolishing and yet which should be modernized in order to return the maximum income from the investment.

Roof Fires at Indianapolis

USE of soft coal is held responsible for the large increase in the number of roof fires in Indianapolis that have occurred during the past few months. The coal throws out numerous sparks, which alighting upon roofs during dry weather, cause ignition and require the services of the fire department for their satisfactory extinguishment.

Present indications are that the Federal Government will complete the erection of a considerable number of houses at Washington, designed mainly to accommodate the women employees who entered the National service within the past two years, and who have been charged extravagant figures for their living quarters by private hotel owners.

Governor Smith, of New York, is attentively studying the suggested erection of additional State buildings at Albany, the estimated cost of which is placed at $3,000,000.

Mayor of Indianapolis Urges Immediate Resumption of Building

HON. CHARLES JEWETT, Mayor of Indianapolis, Ind., in a statement issued by the Information and Education Service of the Department of Labor, urges the immediate resumption of building activities as an aid to business and insurance against general unemployment of labor. Mayor Jewett says his city will go ahead with municipal work and pleads for the courage and determination essential to mastering the obligations which come to the country as the price of peace. In his statement made to a representative of the Division of Public Works and Construction Development of the Department of Labor, Mayor Jewett said:

"We are well aware of the fact that the war cost this country an enormous sum of money—a far greater sum than we, as individuals, can conceive. The demands of war must be paid at whatever cost. We must not overlook the fact that our immediate responsibility is to discharge the cost of peace. Our country responded enthusiastically to every demand made upon it to meet the cost of war. Now that we enjoy the blessings of peace, we should be equally patriotic and enthusiastic in discharging the obligations that naturally come to every community in the readjustment of our entire community life.

"There is hesitation on the part of some in extending business enterprises on account of the prevailing high prices of labor and material. This is evidenced in the building industry. This line of business activity has been at a standstill for two years. A revival of building enterprises will reach into the industrial field a very great distance. It involves setting into motion the wheels of industry which manufacture and produce steel, lumber, brick, cement and all other building material and building equipment which goes into the construction of such work. This means opening up employment for thousands of men in these various manufacturing plants.

"The cost of labor and material is higher than before the war, but there is no reason to believe that these costs will be subject to a perpendicular reduction. It is more reasonable to believe that any decline in these costs will be gradual and not abrupt. The war raised greatly the plane of costs. Wages are higher, materials are higher and living necessities are correspondingly higher. These increased costs are all relative. Therefore, a gradual reduction of the entire cost plane is to be expected rather than an abrupt decline in any line of costs. This being true, the chance of investors and builders suffering financial loss because of building at prevailing prices, is remote.

"A stimulation in the building industry and in public improvements will be of immeasurable benefit to every city. It will absorb the unemployed and keep the community in an active, healthy state. In the war business concerns felt a responsibility to the Nation and the city to hold their business organizations together, even at a sacrifice. This was a part of the cost of war. Now that we have peace the same policy can be applied with the same excellent results and may well be considered as a part of the cost of peace. If we hold back and wait for low prices before we again become active, we shall defeat the very object we seek to attain. We shall lose the money we sought to save."

Another Club House Burns

COUNTRY club houses are notoriously poor fire risks, being usually of frame construction, with wide porches and numerous windows and doors, affording avenues for the passage of the flames once started. Furthermore: their furnishings are light and highly polished as a rule and contribute notably to spread the fire.

The latest property of this kind to burn was that owned by the Ridgewood Country Club at Ridgewood, N. J., the resultant loss being figured at $60,000. Paul Newman, who sought to save some of the goods stored in the building, lost his life through the effort.

By virtue of their character country club houses are distant from fire protection, and hence their construction should safeguard against the fire menace to an unusual degree. This could readily be done, without at all sacrificing comfort or beauty, or materially adding to building cost. Not alone would proper construction increase the safety of the club building occupants, but it would safeguard the trophies usually housed, and which have a sentimental value far beyond their intrinsic worth.

G. Richard Davis & Company, Inc., have taken over the building contracting business of A. L. Mordecai & Son, of New York City, the latter concern planning to devote itself wholly to real estate operations in the future.

Upon plans prepared by York & Sawyer, architects, extensive alterations and additions will be made to the six-story brick and stone building of the New York Academy of Medicine, on West Forty-third street, New York City.

Helpful Suggestions for Concrete Building

WITH the growing popularity of concrete construction the following suggestions for the use of cement, offered by the Alpha Portland Cement Company will be found of value by builders:

Sand for concrete should be clean—free from organic matter—and well graded from coarse to fine. The presence of foreign matter may be easily determined by shaking some of the sand in a bottle of water. If 5 per cent or more settles on top of the sand in the form of a sediment, the sand should be washed.

The crushed stone should be of varying sizes from one-fourth inch to one inch in diameter. It should be clean, hard and broken with sharp angles. Trap, granite and hard limestone are among the best. If gravel is used instead of crushed stone, it should be screened on a ¼-inch screen to remove the sand and small particles, and then passed through a one-inch screen. Gravel should have no rotten stone and should be clean, in order that the cement may adhere tightly. Water should be clean and free from acids, alkalies or oils.

How to Mix

Concrete mixers do their work more quickly and more thoroughly than hand mixing. Where the work does not warrant the use of a mixer, the materials can easily be mixed by hand in batches with good results. Materials should be measured accurately. A bottomless box holding one cubic foot is generally used for this purpose.

Spread the sand in a thin layer on the mixing board, cover this sand with cement spread out in a very thin layer, mix thoroughly by turning three times dry, then add water and mix twice, making a thoroughly mixed mortar. Spread this mortar out in a thin coat on the board and dump the stone on it. Spread the stone out and wet it slightly, then mix the mortar and stone three times. The act of shoveling this mortar into the barrow or into the form will make another turn. Uniform, dense concrete depends upon thorough mixing with enough water to avoid the necessity of excessive tamping in the forms. As soon as the concrete is mixed, it should be removed quickly in wheelbarrows and immediately used.

Building the Foundations

The size and depth of the foundation walls depend upon local conditions—the nature of the soil, drainage, variation of temperature, severity of frost, etc. As a rule, however, the foundation walls for the average sized garage need not be more than 12 inches wide and three feet deep, which will carry it below the frost line.

The concrete for the foundation may be mixed in the proportion of one part cement, three parts sand and five parts stone or gravel. The foundation trench is then filled with concrete and well tamped. The top of the wall should be brought to the surface of the ground and made perfectly level.

Erecting the Walls

The walls of a medium size garage need be only six inches thick and they should be erected on the center of the foundation walls, leaving three inches of foundation on either side. The forms for the walls may be assembled flat on the ground and then raised into position. They should be made of 2x4-inch studding, placed upright, spaced about two feet apart. One-inch boards should be nailed horizontally to this studding and care should be taken to have the joints well matched if it is desired to give a very smooth surface to the finished wall. The forms may be tied at the required distance apart by means of twisted wire passing between the one-inch boards and around the upright studding. Window and other openings may be provided for by making rough frames of one-inch boards, six inches wide, and setting them in the forms at the proper location. In some cases the frame itself may be placed in the forms and concrete cast around it. If this method is employed precautions should be taken against warping of the frames.

The top of the foundation should be thoroughly cleaned and wet, in order that the concrete in the walls will adhere to it. To make the walls strong and to prevent the development of cracks, they should be reinforced with mesh wire or light rods running in both directions. The reinforcing materials should be placed in the centre of the forms before the concrete is deposited. The forms should be left in place until the concrete is hard. In summer the forms may be removed after the concrete is three days old, but in cooler weather they should be left in place for at least five days, and then the concrete should be tested carefully before the forms are removed.

The concrete for the walls should be mixed mushy wet in the proportion of one part cement, two parts sand and four parts crushed stone or gravel. In placing the concrete it should be spaded thoroughly with a thin board paddle thrust between the forms and the concrete in order that the stone or gravel may be forced away from the forms. This will leave a smoother surface than would otherwise result. As soon as the forms are removed the walls should be scrubbed with a stiff bristle brush or a wire brush in order to remove the surface film of mortar and the marks of the forms. This will also give it a pleasing and satisfactory finish.

Laying the Floor

The floor should be laid after the erection of the walls. It may be laid in slabs—the floor being divided into four quarters, one quarter to each slab. By using a light wire mesh or similar reinforcing materials placed two inches below the surface, a single slab may be used for the entire floor.

Excavate to a depth of not less than seven inches and fill in with crushed stone, cinders, brickbats broken up to a two-inch size, or broken tile, to within four inches of the surface of the finished floor. A four-inch layer of concrete is then placed and spread evenly over the entire area. A mixture of one part cement, two parts sand and three parts crushed stone or gravel should be used. The surface should be troweled to a smooth finish and allowed to set.

Bureau of Research for Heating Engineers

FOR the more thorough investigation of heating, ventilating and allied problems members of the American Society of Heating and Ventilating Engineers at their annual meeting in New York City last month, unanimously decided to create a Bureau of Research. Quarters for the new department have been secured at the Bureau of Mines, Pittsburgh, and the use of the admirable facilities of the latter organization pledged.

The Bureau of Research plans to:

(a) Investigate the needs for research in any particular subject and if sufficient to warrant consideration from the standpoint of pure engineering, appoint a sub-committee to

1. Collect all existing data and records;
2. Carefully examine the records and report on actual needs for further work;
3. Report on all available laboratories of colleges or other institutions that might be utilized.
4. Make definite suggestions for line of procedure in research and to confer with and advise the Director of Research upon this particular subject.

(b) Where research work is found necessary and course of procedure is obvious, negotiate with laboratories of colleges or organizations, as offered, or order work handled by director of bureau. No work should be assigned to the bureau that can be handled equally well elsewhere.

(c) If sufficient amount of existing data appears to be available for analysis by committee, to present a synopsis of data to next regular meeting of the Society for discussion and approval.

(d) To report all conclusive data, whether originating through the Research Bureau or committee, or elsewhere, to the next regular meeting of the Society for discussion and approval.

(e) To report on questions of finances, ethics, commercialism.

The step is a most progressive one, from which great benefits should accrue. Through co-operated effort it will be possible to study problems, entailing time, effort and expense such as few individual corporations would care to devote, and yet which must be given in the best interest of the profession.

Elevator Code Hearings

ONE of the liveliest and best attended series of public hearings conducted by the Bureau of Industrial Code of New York was the second series on the proposed new Elevator Code, which were held in Buffalo, Rochester, Syracuse, Utica and New York City, on January 27, 28, 29, 30 and 31.

State Industrial Commissioner Louis Wiard and Deputy Commissioners Thomas C. Eipper and Richard J. Cullen were present at all the hearings as were these members of the Advisory Committee, which formulated the code: Clarence York, General Electric Company, Schenectady; Mark A. Daly, Associated Manufacturers and Merchants of New York State; E. H. Fiesinger, Solvay Process Company, of Syracuse, and National Safety Council; William J. Picard, Engineering Department of the State Industrial Commission and the editor of *The Bulletin*. W. J. Gorman, of the Associated Manufacturers and Merchants, represented that organization at all hearings.

It was explained that the reason for the second series of hearings was that in revision of the code the Advisory Committee had made material changes that the Legal Department of the Commission had ruled that in order to fully comply with the law new hearings must be held on rules 412, 413, 414-c, 417, 418, 435, 473 and 475, covering the installation of electric contact or interlock.

Strong opposition was manifested at all the hearings, principally on the provision requiring electric contacts or interlocks on existing elevators by 1922. The opponents averred that no satisfactory interlock was on the market and they appeared to be of the opinion that until such a device had been approved by the State Industrial Commission the rule should not be made mandatory even in new installations. Several of the objectors wanted the date for existing installations extended until 1925.

In the main, however, it appeared to be conceded that elevator operation should be hedged about with every possible safety insurer, one master mechanic going so far as to advocate examination and licensing of all elevator conductors.

Unique Office Building Largely of Zinc

WITH the completion of a unique seven-story building at No. 160 Front Street, the sky line along the East River in lower New York City has become changed, says the American Builder. Of additional importance is the fact that necessity demanded the completion of this building during the war period when only essential construction work was permitted.

Among the principal features brought out in the construction of this edifice was the quite general use of zinc materials. The design follows the standard of modern architecture, but in the use of zinc for so many purposes, innovations are offered that are of interest to building contractors, manufacturers of builders' hardware, architects and realty concerns.

It is certain that in few other buildings does this metal play so prominent a part. From basement to roof zinc material is embodied both on the exterior and for inside use. Zinc plated door checks, frames, window sash and locks are among the more apparent ways in which zinc is employed. By no means, however, do these represent the only utility of this metal which has so rapidly come into prominence in so many new ways through conditions, in part, brought about by the war.

The building is being built by the Smith Valley Realty Company, for the exclusive use of The New Jersey Zinc Company. This concern, which has stood sponsor for many new uses of zinc in various forms, realized that for building purposes rolled zinc possessed many desirable features. Accordingly, plans were made, when the building was projected, to embody them in the structure. This was at a time well in advance of the ruling of the War Industries Board which called upon manufacturers, as a patriotic duty, to substitute the metal for others in the non-ferrous field for a great variety of uses.

Flashings, gutters and all other outside work are made of rolled zinc, this material having been substituted for copper, heretofore commonly used in construction work. In this not only does zinc perform the functions well, but it is also a material that entails less cost.

"The substitution of zinc for copper offers a new field whereby building costs can be decreased," said W. W. Ferguson, who is supervising construction. "The future should bring vastly increased use of this metal for the above purposes. It is easily worked, is non-corrosive and its durability has been thoroughly demonstrated in Europe, where it has been employed for more than a century."

As one enters the building, the entrance and vestibule doors are found to be constructed of sheet zinc rolled on wood. The knobs and locks are made of zinc plate, a detail that is embodied throughout. Zinc composition is the material embodied in the hinges.

Side walls of the elevators immediately inside are of zinc construction. Likewise, the elevator doors and bell plates are zinc coated, giving a rich satin finish. All of the window hardware is manufactured from zinc plate. This includes sash, locks and handles.

A complete ventilating system is installed throughout the building. The grilles for the registers were first stamped and then zinc plated. These are found in suitable places, their location being designed to produce the greatest possible efficiency.

Floors are of marble, while steel railings are found on almost every floor. Partitions are made of steel and have a natural hardwood finish.

In the interior fixtures zinc materials are consistently employed. This metal is used in the hardware, including trimmings and fittings, of the mail chute. Some of the panel doors enclosing cut-out boxes, enunciator boxes and all low tension work in the electrical equipment are made of zinc plate.

The lighting fixtures are also zinc plate, while frames for the illuminating lamps are spun from rolled zinc sheets. Ornaments that are to be found throughout the building have been cast from zinc.

Paint, enamels and tints that compose the interior decorations include zinc oxide and lithopone (zinc sulphide—barium sulphate) as ingredients. These are ordinarily used by paint manufacturers in the higher grade paints and enamels, however, and their use is, therefore, not considered so unusual in this structure.

Many of the furnishings to be used are designed to be in keeping with the structural features of the edifice. These include desk fittings and office supplies, all of the materials for which are products of the tenant corporation. This applies even to the window shades, which contain lithopone in their construction.

The company moved into the new quarters, which are at the corner of Maiden Lane, about January 20.

Two hundred dwellings will be erected at East Pittsburgh, Pa., by the Westinghouse Company for the use of its workingmen.

The annual meeting of the National Brick Manufacturers' Association will be held at Pittsburgh on February 2—8.

The Shenandoah Milling Company is erecting a large milling plant at Fort Royal, Va.

Building Improving in Middle West

PRIVATE individuals and corporations are responsible for most of the building activity in that section of the country east of the Missouri River and north of the Ohio, according to a statement just issued by the Division of Public Works and Construction Development of the U. S. Department of Labor. The building figures in the statement are for the first three weeks in February and, while they show building activities far below the pre-war normal, they show, also, a marked increase in February over January of this year.

Contracts awarded during the first three weeks in February cover building and construction works to cost, approximately, $92,000,000. The total of the January contracts was but $50,731.000. February's increase over January, since the former figures are for three weeks only, will be more than $50,000,000, or almost double the January figures.

New England is not making the showing western districts are making. The New England States, during the first week in February, reported contracts awarded to the amount of $331,000. In the second week the sum was $554,000, and for the third week, $662,000, making a total for the three weeks of $1,537,000. The January total was $4,648,000. The Department of Labor's statement makes this comment on the New England situation:

"The New England section contrasts in this respect with other sections of the country, especially the middle west, where February is showing a large gain over January in the amount of contracts awarded. Of the contracts awarded during the week ending February 20, private construction was 94 per cent while 6 per cent was for Government construction, nothing in the way of municipal or state improvements being included. Of the private construction 22 per cent was of an industrial character, 32 per cent business, and 46 per cent residential."

New York and New Jersey show a gain in February over January. During the first week in February this district reported contracts on building and construction work totaling $3,716,000; during the second week, $2,242,000, and in the third week, $3,201,000. Total for the three weeks, $9,159,000. The January total was $8,152,000. Of the contracts awarded during the week of February 21, in money value 71 per cent was for private interests and 24 per cent for State and municipal work while Federal Government work was 5 per cent. Of the private construction 78 per cent was of an industrial nature and only 10 per cent residential.

In Philadelphia, Baltimore and Washington and adjacent territory, contracts awarded in the first week of February were of a money total of $2,187,000; the second week the total was $1,577,000 and for the third week $1,577,000, a total of $4,934,000 for the three weeks. The contracts in January totaled $15,805,000. This latter figure, however, was larger than the normal for January based on figures from 1910 to 1917. In that period the January contracts did not exceed $10,000,000.

Ohio, West Virginia and western Pennsylvania show contracts awarded in the sum of $1,960,000 for the first week of February, $3,363,000 in the second, and $1,178,000 for the third week. As January shows contracts in the sum of $7,916,000, if the district keeps up the February average for the last week in the month it will show a slight improvement over January. Residential building in this territory was 38 per cent of the private building which latter was 80 per cent of the total.

Iowa, Illinois, Wisconsin, Indiana, Michigan, Missouri and Kansas, on the basis of the Department of Labor's figures, show approximately a five-fold increase in February over January. For the first week in February, in this district, the contracts reported totaled $14,585,000; during the second week, $8.383,600. and in the third week $46.146.000. The three weeks' total is $69,114.000. The January total was $13.710.000. The Division of Public Works and Construction Development makes this comment on the western figures:

"It is evident that the business men of the central west are waking up to the fact that those who start building early this spring are not making any mistake in the matter of costs. Of the total of over $46,000,000 for the week ending February 22. 91½ per cent was private construction, 8 per cent State and municipal work and a fraction of one per cent Government construction."

Minnesota, North and South Dakota show an increase in February. For the first three weeks in February the contracts in this district total $819.000 as against $500,000 for the entire month of January. In the third week in February 90 per cent of the contracts awarded were for private construction work and of this 21 per cent was for residential property.

In an effort to stimulate a greater demand for galvanized iron cornices, a special committee of the National Association of Sheet Metal Contractors has been named by George Harms.

Harvey S. Owen, a well known engineer, will represent the Lime Association in the Middle West. He will maintain headquarters at St. Louis.

A Department Devoted to the Use of
AUTOMATIC SPRINKLERS
Edited
IRA G. HOAGLAND, Secretary PAUL MASON, Special Representative
National Automatic Sprinkler Association

Construction Defects and the Efficiency of Automatic Sprinklers

THERE was a fire in a large plant, early in January, five miles outside one of the larger Illinois cities of the second class. It was a large establishment, with large connected or closely adjoining frame buildings, and being so far from the municipal fire department, it must of necessity be self-contained with respect to fire protection. Moreover, being of extremely hazardous type of construction, with occupancy hazard rather marked, its system of fire protection should have been of the most modern type, complete and always in effective operative condition; fire prevention methods should have been in full effect at all times, and watchmen should have been vigorous, alert men, trained in the effective handling of appliances, and under intelligent discipline with respect to every possible contingency that might arise in the problem of fire control.

There were serious deficiencies in all these respects and all had their influence in the result; but the chief causes of the plant's destruction were:

Defects of construction.

Incompleteness of protective system.

Inadequate water supply.

* * *

These three factors are so closely related that it is hard to separate them in making an analysis of the effectiveness—or lack of it—of fire control by automatic sprinklers. The plant involved in this fire was sprinklered; yet it incurred destruction—complete loss—because these deficiencies controlled the situation. They usually do in a case of this kind.

They are so thoroughly destructive that, although the aggregate of instances in which fire control by automatic sprinklers has been unsatisfactory, during more than two decades,. has been only 4.5 per cent, these three, singly or in conjunction, have been responsible for about two-thirds of the whole number, leaving only one-third, or 1.5 per cent of all fires in sprinklered plants of which a record has been kept, in which unsatisfactory control has been due to the other six or seven recognized causes, singly or conjoined.

With these facts held clearly in view, it is easy to understand, after the details of this fire are set forth, why there was a loss of $250,000 in this instance.

* * *

Buildings were frame, with wood shingle roofs, either attached or set closely together; areas were large and unbroken on all floors; open wood stairways at both ends of the longer buildings and at least one stairway in every building, unbroken except for floor landings from ground floor (and in some cases from cellar) to roof offered ready channels for the fire to spread; outer walls, were hollow; attics, roof spaces, some stairways and some buildings were not sprinklered, and the only source of supply was a gravity tank, of about enough capacity to supply all sprinklers in the main building not more than 20 minutes.

A 1000-gal. underwriters' fire pump was the auxiliary reserve, but it was in exposed position and was soon put out of commission.

* * *

How and where the fire started, two or three hours after the plant shut down for the night are not known. When a watchman first saw it, the flames were racing up an open, unprotected stairway at one end of the main building. Then they swept through the unsprinklered attic and down the stairway at the other end; tongues of flame leaping in the open entries to the various floors. Flying brands from the burning roof carried the fire to adjoining buildings; and virtually the entire roof had burned off, and the hollow shell of the walls was a mass of flame, before the fire had gained enough headway on the various floors to open the sprinklers.

Then they opened all at once.

About this time, sprinklers in other buildings were beginning to open, further bleeding the system, while unsprinklered buildings, sheds and portions of buildings were adding to the uncontrollability of the flames.

Just before the water supply gave out, part of the main building collapsed, carrying down that portion of the sprinkler system with it. That ended the usefulness of the entire system; for, with the main lead from the tank broken, the little water that remained soon drained out.

* * *

About the time the break came, the fire department, which had received a delayed notice by telephone, arrived from the city, but it could not get to the cistern from which the plant's water supply was pumped, and the only other source of supply was so distant that hose to form three long lines had to be coupled up for two, which threw such feeble streams that they were effective only to save—in whole or in part—a few unimportant outlying buildings.

* * *

This fire contains striking exemplifications of the hazards contained in faulty construction, incomplete protection and inadequate water supply, for the architect, the builder, the owner, the occupant.

There should have been no unsprinklered portions, no concealed spaces; hollow walls should have been fire-stopped and all stairways should have been cut off with fire-retardant enclosures; water supply—single or multiple tanks—should have been sufficient for possible instead of probable maximum flow, and auxiliary supply—underwriters' fire pump—should have been housed in a fire-resistant building sufficiently removed from other structures to be beyond the influence of extreme heat.

These are the salient features of a fire liable to be duplicated in any part of the country. The remedy lies in the provision of comparatively simple and inexpensive safeguards, to be insisted upon by architects, owners and occupants.

Cincinnati's Sprinkler Ordinance

THE Safety and Building departments of Cincinnati, assisted by the insurance interests, as represented in the Inspection Bureau and Salvage Corps, have been trying for more than a year to bring about the passage of a sprinkler ordinance designed to meet a structural condition common to many cities but particularly prevalent in Cincinnati. The effort is being revived and strengthened, and there seems to be reasonable hope for success.

The commercial district abounds with long, narrow buildings of old (and consequently hazardous) type of construction; 20, 30 to 40 x 160 to 200 feet, fronting on streets of only moderate width and running back to 8, 10, 12 and 16-feet alleys—most of them 8 to 10. Buildings are usually 6 to 8 stories high; floor areas are unbroken, and front and rear stairways are not cut off. Conditions in these buildings are ripe for disastrous fires, and a number of typical, costly fires have occurred.

As the congested district (about 100 blocks) is nearly square and therefore very compact, with virtually all blocks menaced by this class of building, fire starting in any one of them is liable to cause a conflagration that may include the whole territory. It is to counteract this conflagration hazard that Superintendent J. J. Conway, of the Underwriters' Salvage Corps, Fire Chief Barney Houston and the Fire Prevention Bureaus—both municipal and insurance—are trying to bring about the passage of an adequate sprinkler ordinance.

No Monopoly Among Sprinkler Manufacturers

AFTER investigation the attorney-general of Massachusetts finds no grounds for the charge of monopoly among the manufacturers of automatic sprinkler systems, or the allegation that they have profited unduly because of the compulsory installation laws of the State. We quote from the findings of the attorney-general as follows:

"It is doubtless true that the fire prevention commissioner, acting under the statute, has created a certain demand for sprinkler devices, as he has required their installation in certain types of buildings where the reduction in insurance rates would not be sufficient to warrant the outlay required merely as a business proposition. This is the case in congested districts where the value of the buildings and contents is not particularly high but where the fire hazard is very great. As the jurisdiction of the fire prevention commissioner is practically limited to the metropolitan district, it is improbable that the demand for sprinklers by reason of his activities has had any appreciable effect upon the price of sprinkler systems throughout the country."

No Monopoly

Regarding a monopoly of the business the attorney-generals finds: "There are some six sprinkler concerns, excluding subsidiary companies, doing business in the Commonwealth, and not more than nine operating in the country. The types of devices have all been tested for efficiency by the Underwriters' Laboratories of Chicago and have received the approval of the National Board. Until fire prevention devices are thus tested and approved, insurance companies generally refuse the benefit of reduced rates of insurance where the same are installed. Thus it is not ordinarily profitable to install sprinklers which have not been so approved. There is evidence that the cost of sprinkler systems has increased between sixty and one hundred per cent during the last two years.

It has been claimed, and not denied, that whereas formerly many sprinkler concerns sold their devices to contractors and plumbers, that custom has been discontinued. Each company now installs its own appliances and refuses to sell sprinkler heads or parts to independent concerns. This has brought many complaints from those who formerly purchased sprinkler devices and installed them. But the companies argue they are interested in the proper operation of their own devices, and that therefore they are justified in taking measures to control their installation.

Finds Competitors

"As a result of the investigation, I do not find that there is no competition between sprinkler concerns. It is obvious that there is no destructive competition, but that there has always been some competitive bidding seems to be true. We are advised by the Fire Prevention Commissioner that he does not order the installation of approved devices when he requires installation of sprinkler systems. While to his knowledge only the so-called approved devices have been installed, he stands ready to approve other types if satisfactory assurances are given him of their efficiency. In other words his department does not demand a particular device but merely something that will operate properly in time of need."

Concrete Wharf at Vancouver

WHAT is conceded to be one of the largest wharfs upon the Pacific Coast is that recently completed at Burrand Inlet in the harbor of Victoria, B. C. The wharf, which is of reinforced concrete construction, is 800 feet long; 300 feet wide and there is a clear depth of 35 feet of water at low tide. "The wharf was constructed by using reinforced concrete cribs which were floated to their proper sites, then filled and sunk. On top of this heavy mass, concrete walls were built to permit a further filling to bring the wharves to the height required." There are two storage sheds on the wharf with trackage on each side; the east shed being 676 feet long, and the west shed 843 in length.

The entire work was done under the supervision of the Vancouver Harbor Commission of the Dominion Government.

As a step toward increasing building activities throughout the country, which is the one immediate hope of reducing unemployment, the United States Railroad Administration will in a few days cut down the freight rates on building materials of all descriptions from the present high level to the pre-war standard. The proposal, put forward by some of the leading economists in the country, has met the approval of Walker D. Hines, director general of railroads.

Lime Industry in 1918

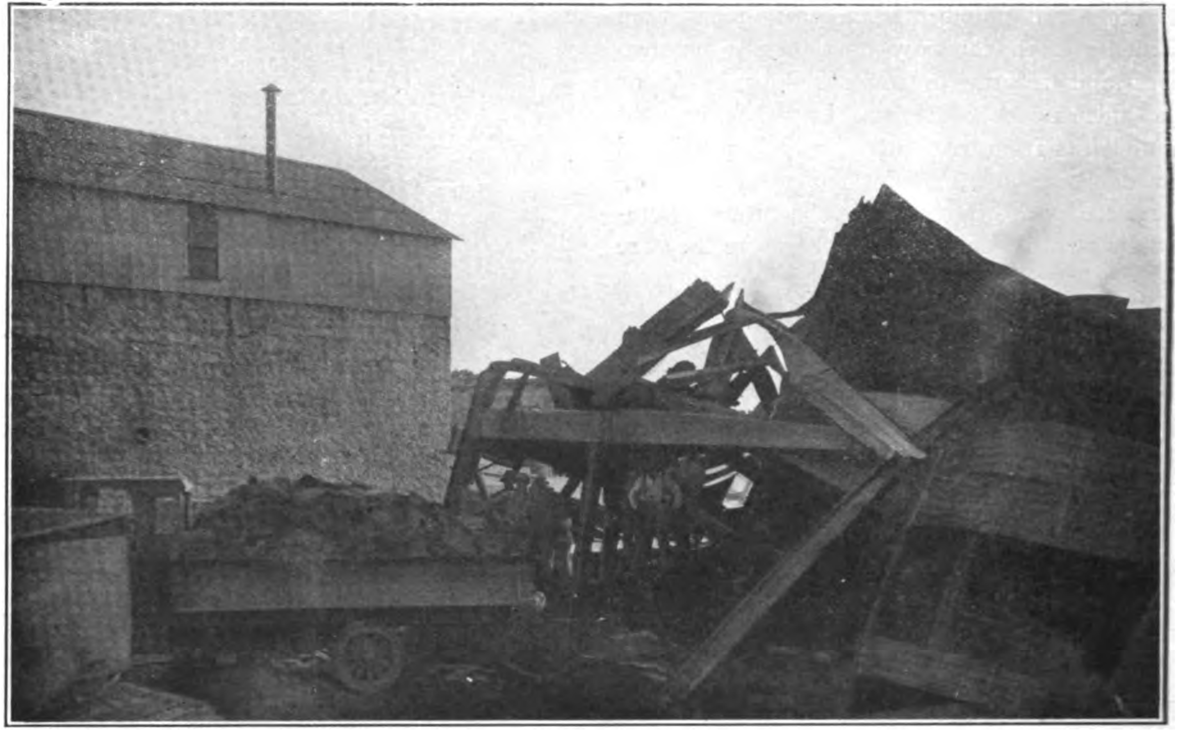
FROM a survey of the Lime Industry in 1918, made by the United States Geological Survey, the sales of hydrated lime in 1918 amounted to about 627,000 short tons, a decrease of 11 per cent from the quantity reported in 1917 (709,757 short tons), which in turn was a decrease of 1.6 per cent from the record production of 1916 (717,382 short tons). Of the principal producing States eight showed increases in sales ranging from 2 per cent in Pennsylvania to 34 per cent in Maryland and 52 per cent in Virginia. The output of ordinary quicklime, including some dead-burned high-magnesium lime for refractories, decreased nearly 22 per cent, from 3,072,207 short tons in 1917 to 2,401,000 short tons in 1918, a decline which indicates that in spite of the adverse conditions hydrated lime held its position far better than quicklime.

Building Lime

War restrictions on the building trades greatly reduced the demand for building lime, the production of which in 1917 amounted to one-third of the total lime output. Manufacturers of building lime, except those who supplied Government contractors, reported decreases in demand ranging from 5 to 90 per cent in 1918, and some plants that supply only building lime were closed throughout the year. A number of Government building projects, most of them in the East, had called for or were likely to call for lime during the last two months of the year, but some of these projects may have been abandoned after the armistice was signed on November 11. All restrictions placed by the War Industries Board on the production and transportation of lime were removed on November 12, too late to have any appreciable effect on the recovery of the industry before the end of the year. In view of these conditions it will not be surprising if the revised and itemized figures show that the building lime sold in 1918 has fallen to about 900,000 short tons and that building lime has for the first time lost to chemical lime its lead among the lime products.

The general curtailment of building operations since the spring of 1917, however, implies that greatly increased activity is necessary to restore the country to normal conditions in this respect, and the Federal Government is already taking steps to stimulate building. Doubtless many prospective builders are inclined to wait for a decrease in costs, but although the cost of some necessary commodities and of labor may decrease slightly, the great demand for buildings will probably maintain the prices of building materials in general at a high level.

Rochester, N. Y., is figuring upon the adoption of zoning districts and more complete building regulations.



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LATEST EDITION

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New York City, N. Y., February, 1919

Priceless

Sees Big Future for Brick

Manufacturers of building brick never had such an opportunity as is now presented for the sale of their product, and they are strongly urged through the house organ of the American Clay Machinery Company to take full advantage of it.

Quoting from the publication:

The clay trade never had such an opportunity as the present. The United States has had two million of its most aggressive and progressive people in Europe. This army of American citizens has had ample opportunity to observe the substantial and permanent brick dwelling habit of Europe. They have seen the advantages and noted the comfort and permanency of building for permanent economy and will return to the United States with new light on the "Build with Brick" idea. They will be for Brick and will talk permanence. Their sojourn in a land of permanence in building will make them enthusiastic for similar construction here. The large majority of this two million people are young. Every person plans to build at some time in his or her life and here are two million persons who have not yet built and who have become inoculated with the build-with-burned-clay idea. If the clay trade doesn't get immense returns from this brick schooling of our war forces, it will be because the trade as a whole and each individual clay worker fails to take advantage of this "biggest ever" opportunity. Some other building material man will get the business if you don't but the logical thing to do is for the brick men to round up this education and turn it into orders. Remember that this army has been raised in ALL PARTS OF THE U. S. It has not been raised in any particular section and therefore YOU have just as good a chance as any one to profit by this brick education. There is no business in the U. S. which should profit more by the war than the clay trade, and the benefits could not have been much more had the clay trade paid to send these people to Europe to look into the building situation. It has cost the clay trade nothing extra to get this advantage, and the trade should be able to spend considerable to take advantage of it. As an evidence of the opportunity we quote from a letter received from a disinterested soldier, who says:

"After having been in Europe a few weeks I am pleased to say that your slogan, 'Build with Brick,' has a new meaning for me. I am not surprised at your campaign for brick buildings, since I have seen how Europe benefits from it. I am for brick strong, and this war will do a lot for the 'Build with Brick' campaign, because it is educating a lot of Americans to the benefits of building with brick."

There isn't any time to be lost in planning and acting to get the biggest possible advantage from the overseas forces. They have fought a good fight in the pursuit of war and can be enlisted in a peace war against the ever-present enemies—Fire and Decay. Get busy.

Fire Protection in New York State Factories

From October 1, 1913, to June 30, 1918, 168,154 orders relating to fire protection were issued to factories in New York State. Compliances were secured with 134,902 of these orders, which compliances were exclusive of 31,428 orders where illegal conditions ceased to exist by reason of modifications in the Labor Law or Industrial Code, or in cases where jurisdiction was transferred by law to New York City departments, or accompanying circumstances such as to make the original orders no longer necessary to be enforced by the Department of Labor. Thus a total of 166,330 orders were disposed of in the period named, leaving 1,824 orders outstanding at the beginning of the fiscal year, July 1, 1918.

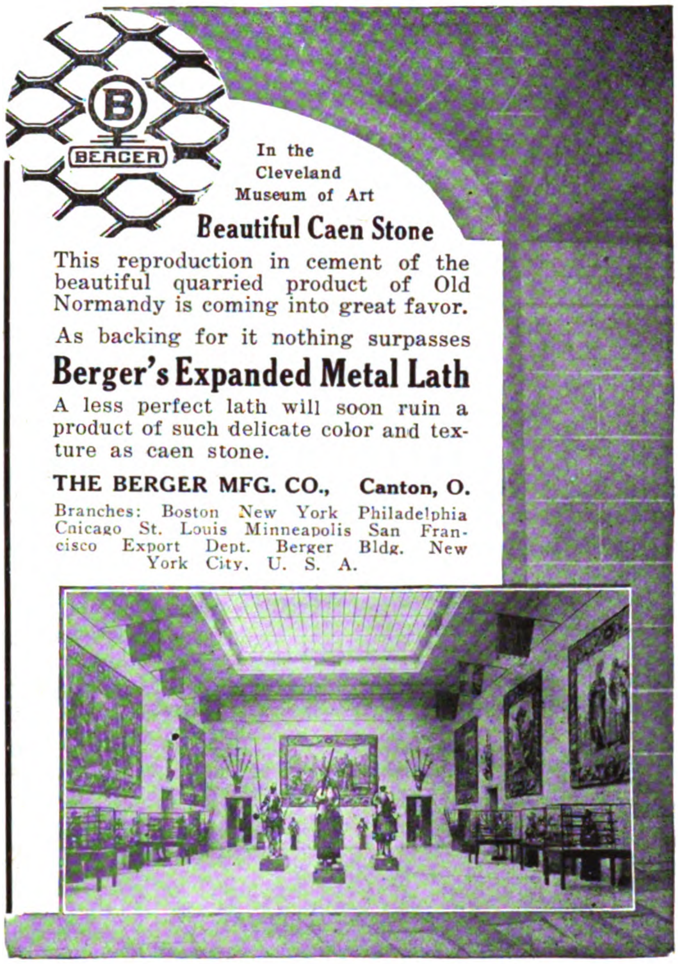
Output of Asbestos in Canada

"Asbestos, which is mined chiefly at Thedford and Black Lake, Quebec," said Wyatt Malcolm, of the Geological Survey Bureau, Canada, "is one of the minerals that increased greatly in output during the war. Its convenience and suitability for building purposes found for it a strong market in England. Although the yield has been increased, development work in the operating mines has not been neglected. A large sum of money has also been spent in developing a property at Coleraine, Quebec, where a big deposit of mineral of excellent grade occurs. The asbestos mines are, therefore, in a good position to cater to a large market, and the prospects are bright. The recent placing of a large order by the British Government for Canadian lumber is indicative that construction work is to be proceeded with and there is likely to be a good demand for the quality of asbestos known as shingle stock."

Fire Losses in East Orange, N. J.

Fire losses of $20,677.25 reported by Fire Chief George L. Mitchell for the past year in East Orange are lower by $9,779.50 than in 1917. The figure ranks among the lowest on record for the city. The biggest loss of the year is placed at $8,000 for the fire in September that destroyed the Rollo Rink in Halsted street. The efficiency of the department, the chief says, is preventing fires from gaining headway. He points out that the value of property exposed to danger where fires have occurred, exclusive of contents, amounted to $929,400.

A total of 1,508 inspections to eliminate possible fire hazards in business sections or apartment houses is mentioned by Chief Mitchell as having helped to hold down the fire losses. During the year a total of 269 alarms were sounded, four less than in 1917, and eighteen were false.



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Should Increase Use of Sprinklers

Until about three years ago Paterson (N. J.) business houses that installed sprinkler systems as protection against fire were required to pay $200 annually for a six-inch connection with the water mains. Now the charge is only half the former figure, and the reduction was made by the private company operating the water system. It was a good business move to invite sprinkler protection, measured simply by the rule of revenue.

Paterson business men found the old charge of $200 yearly for a sprinkler connection a serious expense for a thing that was not operating as a part of their business plants, and they protested through the Board of Trade. The water company gave an attentive ear, but was unresponsive.

The Newark "Star-Eagle" makes this comment:

"In Newark, where the water system is owned by the city and supposed to be operated for the welfare of the citizens rather than for revenue, a sprinkler connection costs twice as much yearly as it does in Paterson. The city of Newark, in assuring the steady prosperity of its industries by encouraging the biggest factor in lowered fire risks, would be insuring the maintenance of millions of dollars' worth of property on which taxes are paid toward the upkeep of the municipal government. It was good business for a private water company in Paterson to cut its sprinkler rate in half. It would be better business for the city of Newark to remove altogether the inequitable tax it now assesses against sprinkler installations."

New Ransome Catalogue

The 50-page catalogue of Concrete Chutes and Equipment just issued by the Ransome Concrete Machinery Co., of Dunellen, N. J., is a veritable treatise on the subject of concrete distribution by chutes. It has been prepared with the particular purpose of enabling the contractor or engineer to lay out a complete concrete plant without the necessity of referring to various catalogues and handbooks. As such it forms a most interesting and helpful presentation of the standardized methods employed in connection with Ransome equipment in the distribution of concrete. Not only does it show a wide variety of equipment and applications but the many plans and views of complete plants which are introduced assist materially in picking out the arrangement that will best fit the needs of a particular job.

Architects and others interested in learning about the Corr-Plate floors supplied by the Corrugated Bar Company of Buffalo, N. Y., may learn particulars from the catalogue issued by the Company. The work contains numerous tables and illustrations, explaining the text descriptions.

Novel Concrete Office Building

Novel details of construction mark the newly completed structure of concrete at Nos. 35 to 39 Broadway, now occupied by Gaston, Williams & Wigmore, Inc., the first building of its type to appear in the lower part of New York's great artery of commerce.

"So impressive and solid is the facade that passersby gain the idea that it is of solid granite. Although no effort has been made to imitate granite," said Alfred C. Bossom, the architect, "this effect has developed from the unusual method of treatment employed in this fabric of cast concrete. The concrete blocks were first roughly finished at the place of manufacture and when they reached the city they looked so much like the output of a quarry that casual observers could not see the difference.

"When the blocks were erected the entire facade of the building was re-tooled and finished. The ornaments about the doors and at the tops of the columns were carved before the concrete had entirely hardened and not cast. The use of water-proofing substances in the mixing of the concrete gives the material a uniform tone and contributes to its fine appearance. Much the same technique was employed in the treatment of the materials as that followed in Cuba and other southern countries.

"Although the method is not so well known in the United States, it is likely to be adopted by those who desire substantial structures, but the expansion of whose business cannot wait upon the slower means of construction which marble and granite impose.

"Originally it was intended to make the building much higher than it now is, but in view of war conditions the suggestion of the Washington authorities was accepted and the plan was not carried out in full. Shortage of labor and the difficulty of obtaining materials are therefore responsible for the ingenious adaptations through which war time necessities were met and overcome.

"This innovation in business architecture is in its general style a free treatment of the Roman classic. The huge columns give a monumental appearance, and between them are wide spaces, in which windows running from floor to ceiling in the various floors admit all the available light to the interior.

"Additional natural lighting is obtained by small courts. The building extends from Broadway to Trinity place, occupying a lot approximately 90x193 feet. Owing to the depth of the site and the fact that the land is so valuable, it was thought best not to give any more space than was absolutely necessary for the courts or the internal lighting. The central court, therefore, is not large, and two additional walls divide the structure into practically three buildings. It is possible to so arrange the interior because the firm has its business divided into three general departments, so each may thus have its complete quarters, all duly separated by fire walls and fireproof doors."

Meeting the Situation

How the people of Huntington, Ind., dealt with the building problem of their city, is interestingly described by a writer in the "Building Age." In part he says:

"One year ago several of our progressive builders and supply dealers and lumbermen thought of a novel idea and a very good one to help to increase the interest in the building situation in our own locality. We organized what we called the Huntington Community Development Club. The organization was made up of the lumber dealers, building supply dealers, hardware merchants, plumbers, electrical contractors, sheet metal contractors, furnace dealers, furniture dealers; in fact, any class of people in our community who were interested in the sale of material entering into the building of a modern home.

"We elected a president, secretary and treasurer, and an advertising committee. Our plan was for each member to subscribe a small amount toward a fund to be used for educating our people to the fact that they should build homes NOW. We used a full-page space in our two daily papers, and the result, we are confident, was that we encouraged a great many people to build homes which were badly in need in our city at that time, and are still just as badly in need.

"The plan worked out so well and we had such a good reputation last year that we have reorganized our committee again this year and have added a number of other firms to our list, including real estate dealers, building contractors, such as carpenters, masons and cement contractors.

"In raising this fund we have no contribution larger than $25 and nothing less than $10. This gives us a fund of between $500 and $600, which we will invest in full-page space in our two daily papers. You can readily see that this is a very small expense to any one of the firms interested, but on the whole it will amount to fine publicity in increasing the interest and building conditions in our own locality.

"You understand, of course, that the advertisements refer simply to general building conditions and do not advertise any one particular commodity.

"We had some mighty fine copy in our last year's campaign and I think we could furnish any one who would be interested with duplicates of our copy if they would care to adopt the same plan. Furthermore, if any of your readers wish to go into this matter and adopt the Huntington plan and will correspond with the writer he will be very glad to put them on a mailing list and send them copies of our local papers as our advertisements appear.

"I am confident that if all of the smaller cities would adopt this plan, which would not be a very expensive one owing to the small rate for advertising space in cities of this size, that we would create a great deal of interest throughout the United States and encourage a great deal more building than would be possible if the attention of the people was not called to it through a sane and careful advertising campaign."

What do you think of this scheme? Why not write to Mr. Triggs and get in touch with the methods which have brought such excellent results in Huntington? The plan is a good one and has proved its result-getting possibilities. Why not try it in your town?

An illustrated booklet describing its colorblend shingles is being sent the trade by the Johns-Manville Company of New York City. The asbestos shingles of this concern have long been famous, and under the new color scheme they have been made increasingly attractive.

David Craig, 70 Broad St., Boston, has published a small work describing portable concrete structures, which may be erected by any competent masonry contractor.

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The second purpose is accomplished by **actively fighting for legislation favoring firesafe construction** and against laws permitting the continued use of wood—and remember that no company can do this work as effectively as a publication, that the "fireproofing fraternity" at present is a composite unorganized body comprising a number of separate units representing more than a dozen industries, that there is practical need of a national mouthpiece such as you have in CONSTRVCTION, that **makers of fireproof materials are now getting but one per cent. of the business which ought to be theirs,** that advertising in CONSTRVCTION is helping yourself to get more orders, giving your goods the representation they deserve—and according this publication the cooperation it merits.

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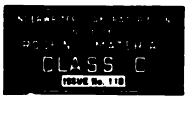

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GRAND RAPIDS MICHIGAN

CONSTRVCTION

ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

George A. Watson, Editor Ralph P. Stoddard, Associate Editor
Wm. Wallace Ewing, Consulting Eng.

Volume Eight **Number Three**

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1919

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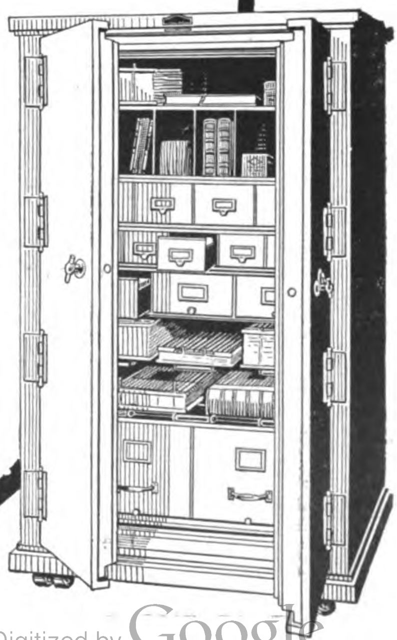

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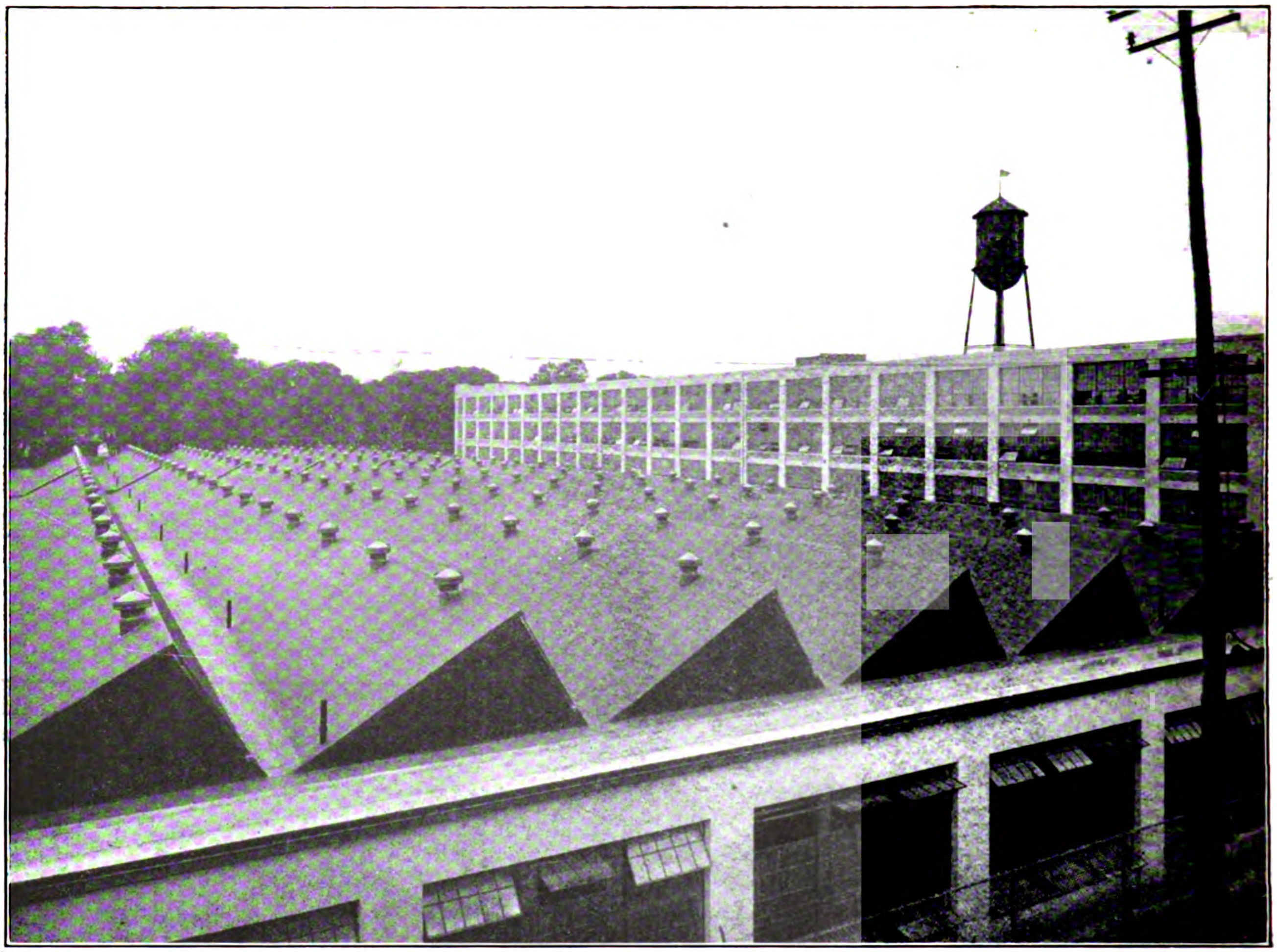

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CONSTRVCTION
ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

VOL. VIII MARCH, 1919 No. 3

Important Results of Reconstruction Conference

THE Reconstruction Conference of Governors and Mayors recently held in Washington at the call of Secretary Wilson of the Department of Labor, accomplished a number of important results.

It impressed first of all on all the participants that the labor problems of the country must be viewed as they arise with a more complete understanding of the basic conditions. There were men in the conference, chief executives from cities, who arrived with the feeling that such labor disturbances as they had at home were merely local demonstrations which had originated either from the adverse attitude of the employers, or because of some petty incident in local labor circles.

By getting together and exchanging impressions in an executive "town meeting" session, with plenty of opportunity for discussion, the men were given a wider vision, and it is certain that those who were disposed to regard labor mixups as parochial affairs will now approach them with a clearer understanding and appreciation of the responsibilities. There is no gainsaying that in many cases the possibility that labor disturbances were political rather than mere wage or hour disputes, came as a new idea. No chief executive will be any the worse off because he has learned to carefully size his job and to estimate its full significance in advance.

The formal declaration of Professor Irving Fisher, the economist, that we are permanently on a higher price level, and that prices will stay up, was sufficiently important a declaration to justify the calling of the session, if no other statement had been made.

The general impression that somehow prices of materials and labor are due for a drop within a relatively short time, has been one of the most stagnating features of business life. It is because this feeling is so generally current, that billions of work has been held up throughout the country, private and public. It is not that men were anxious to dodge their responsibilities, but they had the natural feeling that if prices were to drop, they did not see why they should adventure in advance of that drop on large undertakings. Long before Professor Fisher prepared his paper, it can be said that the experts of the Department of Labor working in the Construction Division had within the last three months reached the same conclusion from a study of conditions following the Civil War.

It is interesting to note that although the Fisher statement was one of the declarations glossed over by the newspapers at the time, it is now being reprinted generally throughout the country by banking and economic authorities, and as yet, there has been no attempt to upset the conclusions. This declaration has fortified every Governor and Mayor who will be able to use it to meet his budget committees who may suggest the delay in public undertakings until the reduction materializes.

The unanimity of the decision of the conference to indorse outright the Department of Labor policy for the deportation of such aliens as advocate or plot the overthrow of governmental forces was also one of the important achievements of the meeting. This is another problem which, in many cases, was being settled on a local basis, and there is no denying that Governors and Mayors have been handicapped by the doubt as to how their brother officials might act. Now after a full discussion by representatives from all parts of the country, the executives present have formally indorsed this method of procedure, and all will feel safer in following this course. The fear that other Governors or Mayors may perhaps take issue with them has been dissipated.

Having in mind the diversified political elements participating, that there should be ten points of agreement is significant. When the conference resolution is reduced to plain, concrete statements, the conference agreed on these propositions:

1. The Department of Labor's policy of deportation for such aliens as advocate or plot the overthrow of the present government was indorsed.

2. It was agreed that, in all probabilities, the railroads would remain under government control for 21 months after the signing of the peace treaty; that the Federal Government should go ahead with such rail-

road improvements and expansions as are essential if our transportation systems are to approximate their possibilities as an aid to commerce.

3. There should be no hard and fast price fixing by governmental agencies, but these should investigate and make public their conclusions as to fair and equitable prices, permitting public opinion to do the rest.

4. It was agreed that present freight rates on road and building materials are hampering activities in these fields and a revision of these rates is urged.

5. That there should be no reduction of the labor wage level or living conditions for labor, not only was the majority sentiment of the conference but it was, approximately, the unanimous sentiment.

6. It was agreed the Federal Government ought to continue its survey of natural resources to the end that the conservations imperative in war might be encouraged in peace activities.

7. That the Federal Employment Service ought not to be discontinued during the period of transition.

8. That it would be helpful if demobilization might be effected through local draft boards so that men in the Army would not be released until they were returned to their original communities.

9. That memorials should be undertaken and should be of a utilitarian, rather than of a purely ornamental character.

10. That States should be devising a way to force into use such natural resources as are held by speculators.

As a concrete, constructive program for industrial readjustment the foregoing may leave much to be desired, but who will say that two or three hundred men, be their ability and brains however exceptional, in three days may formulate to the last detail the constructive program which will counteract the disorders wrought through four years of war—a contest of unprecedented magnitude which concentrated the ability and brains of the entire world on destruction.

Price of Masonry Building Products

EARLY in the present month the ruling prices for leading building products upon the New York market, according to Dun's Report, were as here given:

The best grade of common brick will be sold on Monday in this market for not less than $16.50 by one concern at least, and on the same day quotations for this commodity at Atlantic City will be $22; Canton, O., $16.75; Epping, N. H., $18; San Antonio, Tex., $14.75; St. Joseph, Mo., $16; Belleville, Ill., $17, and Decatur, Ill., $15. In Portland cement manufacturing districts the expected drop in prices will not occur because production is proceeding 45 per cent. below normal and some mills have closed down with little or no reserve stocks. Since January 1 manufacturing costs for this commodity have advanced greatly and it has just been ascertained that road building programmes of States will require 56,000,000 barrels of Portland cement during the next two years, with an annual output of only 93,000,000 barrels, despite a building construction programme for the nation about three times greater than normal with a potential export demand still to conjure with as a further drain upon the country's cement producing capacity.

Another factor in favor of building construction is that of greater efficiency of labor. A large concrete construction company recently made a test of a cubic yard of concrete made last week with an identical cubic yard laid under Government contract conditions in November before the armistice was signed. With the same cost of materials the cost has reduced 80 per cent. because of the greater competition among laborers to get and hold a job to-day as compared with early November conditions, and an identical cubic yard of concrete compared as between November 8 and January 1 showed only a 30 per cent. lowering of cost attributable to greater labor efficiency.

With the increasing competition for jobs among building artisans apparent in almost every trade and the disposition of private contractors to get their projects going before the State and nation come into the market for large quantities of materials, thereby benefitting from the present base prices the building season is approximately 5 per cent. under way as of March 1, taking 1916 as a comparison, and if the labor difficulties can be smoothed out, when the building season formally opens, a market 20 per cent. of normal will be under way with a maximum limited only by the ability of the building material manufacturer to meet the demand.

New Buildings Planned

PROMINENT among the larger building projects planned in various parts of the country for the near future, are the following:

An up-to-date theatre to cost about $150,000 at Tampa, Fla.; a Masonic Temple and a Y. M. C. A. hall at Springfield, Ohio; various structures to cost in all a million dollars for the Methodist Episcopal Church at Baltimore; a $300,000 addition to its present head office building by the Western and Southern Life Insurance Company, of Cincinnati; a fifteen-story office structure to cost approximately $1,000,000 by the Central Savings and Loan Company at Youngstown, Ohio; a $135,000 home for the City National Bank, of Galveston, Texas; a $750,000 series of buildings for the General Hospital at Elizabeth, New Jersey.

Reduced Wages Not Necessary to Resumption of Building

THAT a reduced wage scale is not an indispensable preliminary to resumption of activity in the building trades is the opinion of Morton Chase Tuttle, who has just returned to Boston after more than a year of service as production manager for the United States Emergency Fleet Corporation. Mr. Tuttle bases his judgment on some very recent investigations of large construction enterprises located at various points from New England to Florida, supplemented by careful studies carried out under his direction by the Aberthaw Construction Company of Boston, of which he is General Manager. These unmistakably indicate that increased efficiency of labor is bringing down costs even while wages remain at existing altitudes.

"In the course of viewing numerous undertakings more or less closely associated with interests of the Government," says Mr. Tuttle, "I have lately been impressed to find the statement commonly made that costs of operation are beginning to show a noticeable decline. And this, almost without exception, was attributed to increased efficiency of the labor force, due in part to the opportunity for weeding out the less dependable workers, in part to the growing desire of all members of the force to retain their jobs.

"Owing to inadequate or otherwise unsatisfactory cost systems maintained in connection with most of these undertakings, I found it impossible fully to check the statement by actual figures. Accordingly, I asked my own Company to make out the cost of any one process in an operation continued over a period of several weeks. That which was selected was a piece of concrete work; the costs studied were those for the common labor employed on this work from January 7th to February 4th of the present year inclusive. During this period the wage scale remained unaltered; but the personnel of the labor force underwent frequent changes.

"A graph of the labor cost of the work during the period noted shows a sharp and almost undeviating decline from day to day. On February 4th these costs were exactly 50 per cent less per unit than were those of January 7th. It is my belief that the experience of my Company is by no means isolated; and that in almost any labor force there lies the opportunity of realizing economies ranging from 20 to 50 per cent without interfering with the wage scale.

"This implies, of course, that there is now increased opportunity for selecting men according to their suitability for a given task, and an increased eagerness on the part of the men to make good. But this is as it should be; and the whole country ought soon to feel the effect of it in general improvement at all points. It is a case of supplanting so-called *liquidation of labor* by proper *adaptation of labor* as a means of keeping the cost of doing things within the bounds of utility.

"And in this connection it may well be urged that state of mind is often as potent a factor in ultimate labor costs as is the rate per hour. Any one experienced in handling workmen has recognized the difference in output between a cheerful capable man, anxious to hold his place, and one who is a little disgruntled, and quite conscious that he can get another job the moment he drops the present one. Multiply either case by thousands of individual instances and I believe that there will be found, in shifts of mental attitude, the explanation of much of the variation which occurs in the unit cost. And this, after all, is the element of labor which directly affects the profits of the employer."

Plan a Fine Office Building

AS a home for the marine insurance interests located on lower William Street, New York, the Merchant Marine House will be erected on the north side of Beaver Street near William. The new building, which it is expected will be completed by the end of the present year, will be nine stories in height, and of stone construction. It will be modeled largely upon the lines of the Telephone building erected on Whitehall Street a year or two ago.

Building Activity in New York State

BUILDING work authorized in New York State took a decided upward bound from December, 1918, to January, 1919. The increase in the estimated cost of such work for this period, as reported by the building departments of the first and second-class cities, amounted to 123 per cent. The only cities which failed to share in this rise were Troy, Albany and Utica, where the amounts declined 1, 20 and 50 per cent., respectively. This is the first time there has been a decided indication of revival in building activities so early in the season, as this tendency is usually not manifest until March. The total amount reported for January was $5,645,329, which is 9 per cent. less than a similar sum reported in January, 1918. Estimated building costs reported for January, 1918, 1917 and 1916 were, respectively, 6, 12 and 15 millions of dollars. The Boroughs of Brooklyn and Queens, and the cities of Binghamton, Schenectady and Syracuse reported larger prospective expenditures for building in January, 1919, than in January, 1918. The Boroughs of Manhattan, Brooklyn, Bronx, Queens and Richmond, and the cities of Binghamton, Buffalo, Rochester, Schenectady, Syracuse and Yonkers reported larger amounts of work authorized in January, 1919, than in December, 1918.

Future Costs of Labor and Building Material

UPON another page is printed the bulletin issued by the United States Department of Labor, summarizing the conclusions reached at the Reconstruction Conference of governors and mayors recently held at Washington at the call of Secretary Wilson. The marked revival of building activity which it was confidently predicted would immediately follow the conclusion of the war, failed to materialize, such work as has been undertaken either by municipalities or private interests, being of a relatively minor character.

Despite the unprecedented demand for additional homes, mercantile, industrial and public buildings that exists today, because of the virtual cessation of such effort in the past two years, prospective builders were deterred from making investments through the feeling that the prices for labor and material would drop to pre-war schedules, and they did not care to begin work until the reduced figures governed.

From an exhaustive study of underlying conditions, Professor Irving Fisher, the well-known economist, has reached the conclusion—shared in by experts of the Department of Labor working in the Construction Division—"that we are permanently on a higher price level, and that prices will stay up." Justifying his belief in this respect, Professor Fisher says:

"The main reason why business is not going ahead better is that most people expect prices to drop. The merchant is selling, but not buying. The manufacturer holds up the purchase of his raw materials. People quote the disparity between present prices and those prevailing 'before the war,' and decide they will not buy much until present prices get down to 'normal.' This general conviction that prices are sure to drop is putting a brake upon the entire machinery of production and distribution. Readjustment waits because we keep on waiting for it. We have waited in vain for over three months. It is interesting to observe that many manufacturers think that prices must come down, including the price of labor; but they are ready to demonstrate to you that their own prices cannot come down, nor can they pay lower wages. Almost everything they buy somehow costs twice as much as before the war, and their labor is twice as dear. They cannot pay their labor less if labor is to meet the increased cost of living. Now, as a matter of fact, when we investigate almost any individual one of the so-called high prices for industrial products we are likely to find that individually it is not high; that is, it is not high relatively to the rest. Our quarrel is with the general level of prices."

In the light of the above—the reasonableness of which cannot be gainsaid—it behooves all planning building erection to dismiss from their minds all thought of substantial reduction from existing prices and to accept conditions as they are. Architects, engineers, contractors and all others in position to counsel property owners, should frankly explain the situation, and urge their clients to undertake work without further delay.

Opportunity to Erect Farm Buildings

WITH all restrictions upon the free use of building materials removed, farmers are now able to secure whatever they require in this direction, and not a few of the more progressive of the fraternity are taking advantage of the fact. Receiving unusually good prices for his crops, and a ready market for all he can produce, the farmer has available cash with which to either erect new buildings or remodel and repair those now in use. That he can be induced to make such desirable investment if properly approached is evidenced by the success attending the campaigns for silo building being conducted in Missouri, Oregon and Colorado; the drive for modern milk houses waged in Wisconsin, and agitation for other forms of farm building betterments waged in Texas, Nebraska and elsewhere.

In practically every case the campaign contemplates the use of masonry instead of wood for building material; the temporary nature of the latter, and its ultimate high cost as compared with the wearing qualities of concrete, brick or hollow tile, militating severely against its further use.

If the advocates of permanent building material are awake to their opportunity, they will take full advantage of the field now open to them among the prosperous farmers of the country.

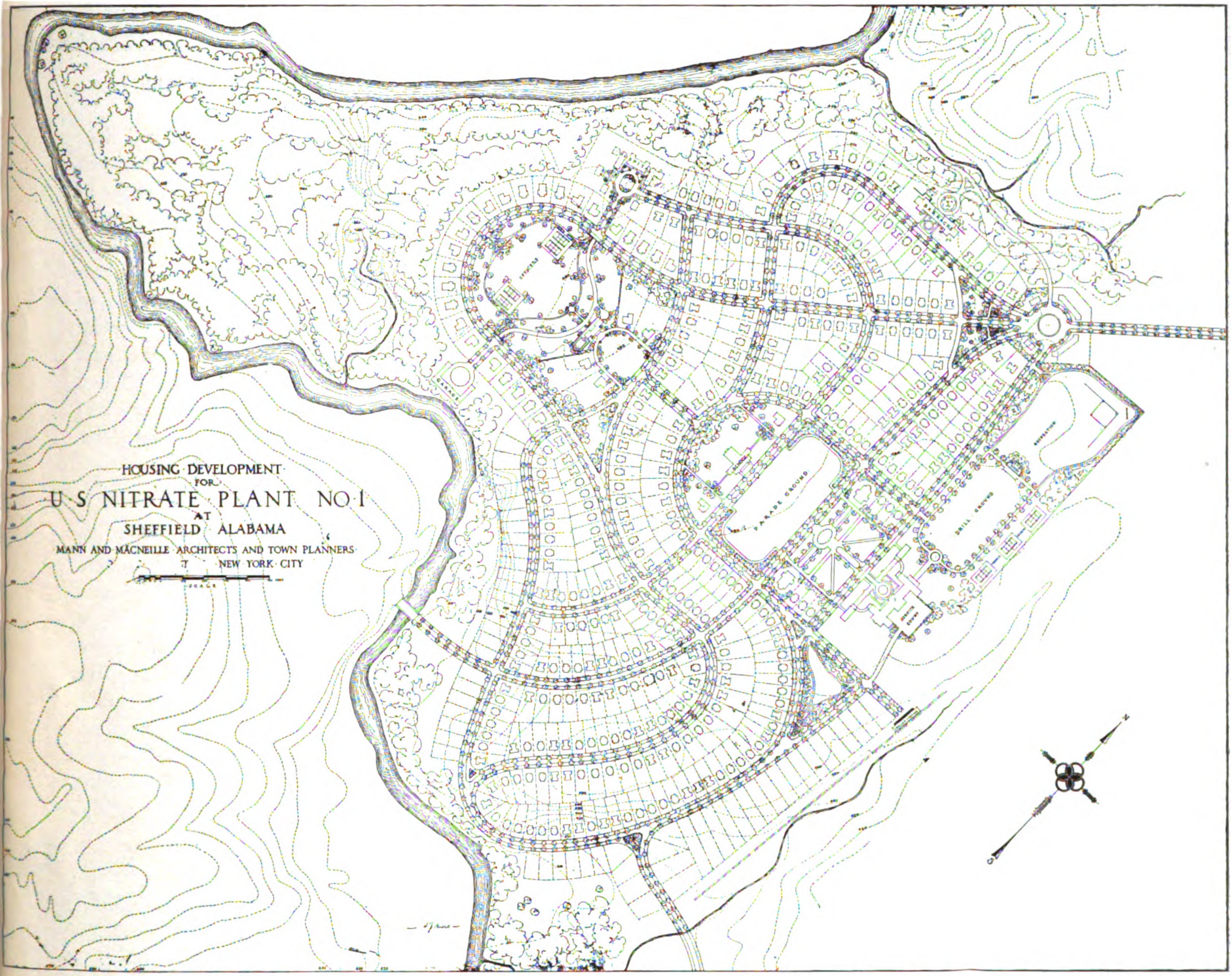
TO the Turner Construction Company of New York City has been awarded contracts for building a number of industrial structures, recently. All are to be of concrete, designed to meet the particular needs of their respective owners. Included in the list of orders are the following: For a group of four buildings for the Bristol Meyers Company at Hillside, N. J. The largest building of the group will be 80 by 300 feet in length, and five and a half stories in height; the second will be 50 by 50 feet, two stories high; the third, an extension to the chemical building, will be 95 by 75 feet, one story in height, while the fourth will be a boiler house, 94 by 44 feet.

Encouraging results are reported from the experiments of lime manufacturers to "make a fine gray stucco suitable for exterior use, the new product being composed of lime and ground slate."

Chemical lime in building and construction work is used in making plaster, mortar, concrete, stucco, gypsum products, sand lime bricks and slag brick.

A Notable Example of An Industrial Settlement, Artistically and Conveniently Designed

All Buildings of Stucco and Hollow Tile Construction With Tile Floors and Roofs



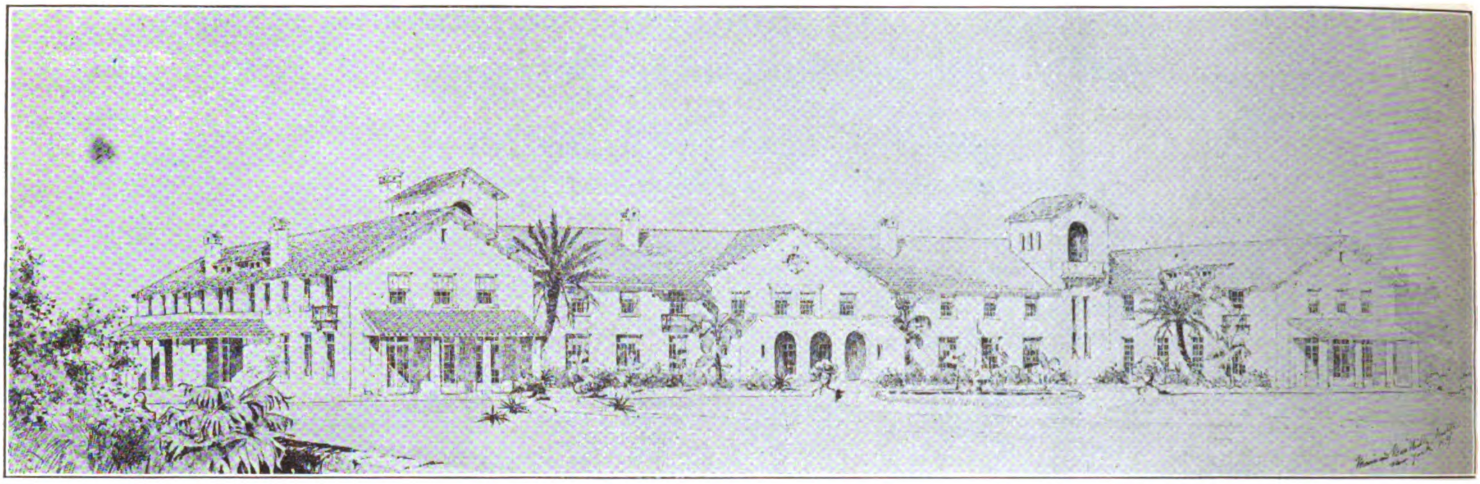
The planning of this town development sufficiently attests that artistic effect as well as comfort can be obtained without encroaching upon utility

WIDE and highly favorable comment has been aroused by the Housing Development plan recently completed for the United States nitrate plant No. 1, near Sheffield, Alabama. The work throughout was designed and supervised by Mann and MacNeille, of New York City, who enjoy a high reputation as architects and town planners, and was under the final jurisdiction of the Nitrate Division of the Ordnance Department at Washington.

All buildings are of stucco and hollow tile construction, with tile floors and roofing. A limited quantity of wood is used for light partitions only, thereby reducing the fire menace to a minimum, and insuring not only the comfort of the occupants but their safety as well.

Intended for permanent use the Government authorities very wisely decided that all structures should be of a substantial character, hence their adoption of masonry material instead of inflammable lumber in the construction.

Lying advantageously upon the Tennessee River just outside the town of Sheffield in Northern Alabama, the site of the industrial development, to



Community Building at Sheffield—The attractive California mission type of building was followed with pleasing effect

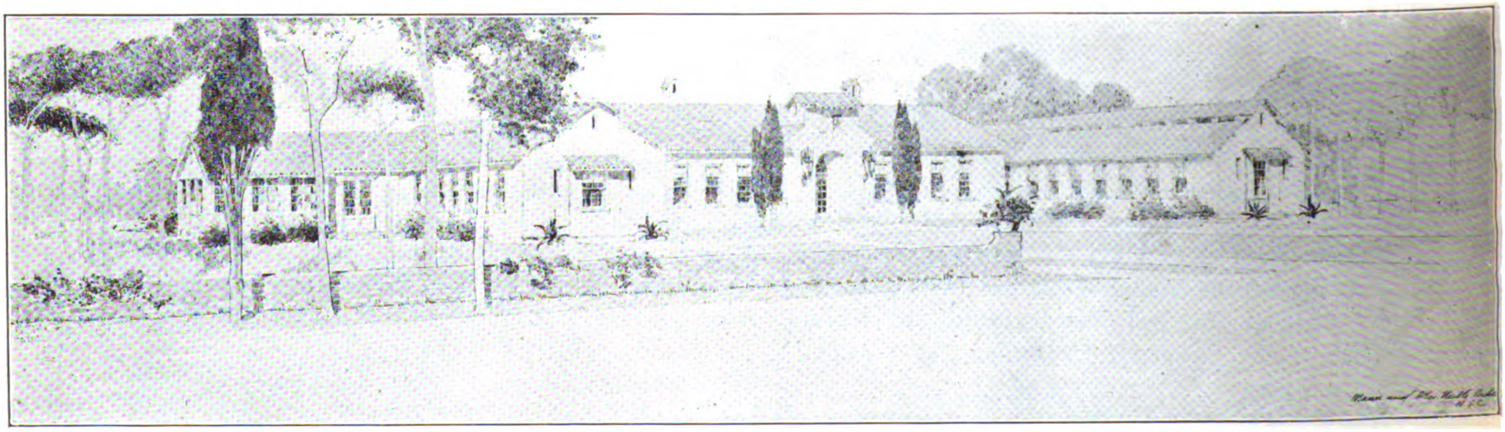
quote from a late issue of "Realty," is a plateau of interesting topography. It is roughly of a wedge shape, the acute angle being defined by the course of the river. The Tennessee is here subject to flood conditions periodically, when it climbs thirty feet or more up the slopes of the promontory. The town itself is however, well insured against injury since its general elevation is another thirty feet higher than the high water level. It is safe to predict that the scenic effects during spring freshets, when the town becomes flood bound on two sides, will be one of the features of life in the community.

The town plan which Mann & MacNeille have produced is a logical solution of the problem. The village is primarily residential and of a class considerably better than the average. It is permissible, therefore, to adopt a layout with a minimum of business area, and allowances of exceptional generosity for parking, playgrounds and reservations of a like character. Of greater importance still, as a determining factor in the street system, was the topography. A comparison of the roadways with contours will show at once how carefully the streets were laid out to give easiest gradients, best building sites, and the most natural adaptation to the lay of the land.

The development being, as we have said, primarily residential, the zoning features are less marked than in many cases. The main subdivisions are between military and civilian occupancy, and between ranks in the military. The main approach from the town of Sheffield enters the village at a sort of neighborhood center—a rondpoint as expressed in plan, about which will be disposed those shops which even the smaller sectional divisions of a town need to have provided. These will include a newsstand and cigar store, barber shop, drug store, tailor and shoe shop. Here, also, will be located a Government commissary and any further expansion of business which may later prove necessary.

Radiating from the Center

From this point the main artery approaches the chief center of the village—the large, open square about which are grouped the school, the churches and the hotel. These are placed on the main axis of the plan—an axis which is carried up the slope to the house of the commandant, and beyond through the group of officers' houses, which form a half circle around a semi-private park. This officers' group occupies the highest area of the tract, receiving also the benefit of practical possession of the high wooded promontory which looks out on two sides over the



Hospital Building at Sheffield—The essentials of safety, light and ventilation have been fully secured.

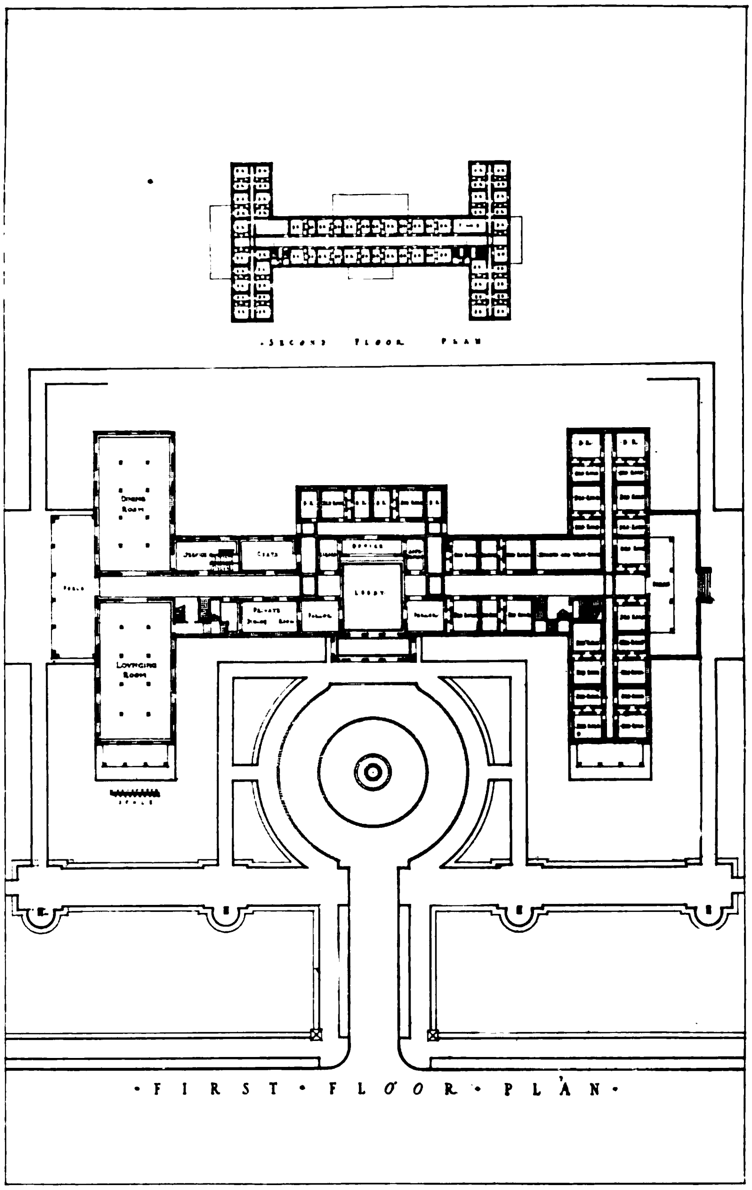
river below. The edges of these slopes at each side also give building sites for a community garage at the south and for a hospital at the north.

Street widths have, of course, been adjusted to the functions of different streets—the main approaches widest, though even secondary thoroughfares and residential streets are allowed 50 feet. Of this width, only 24 or even 20 feet will be constructed as roadway, which leaves space at each side for planting of street trees and for grass borders.

In a town plan of informal character such as this, the lotting is necessarily varied in size and shape. The variation in this case is increased by the requirements of the problem in the wide range between grades of house. Typically, the lots for employees' houses run 50 by 100 feet in depth. From these the size is graded up through the lots for other employees, officers of lower rank, then those for the four majors whose houses lie at each side of the commandant's, and finally the plot set aside for the commandant—a double-winged area containing altogether nearly two acres.

This plot is at the highest point of the plateau, looking down on the one side westward about the curving group of officers' houses, and on the eastward past the group for the majors, beyond the school and over the open square to the large hotel opposite.

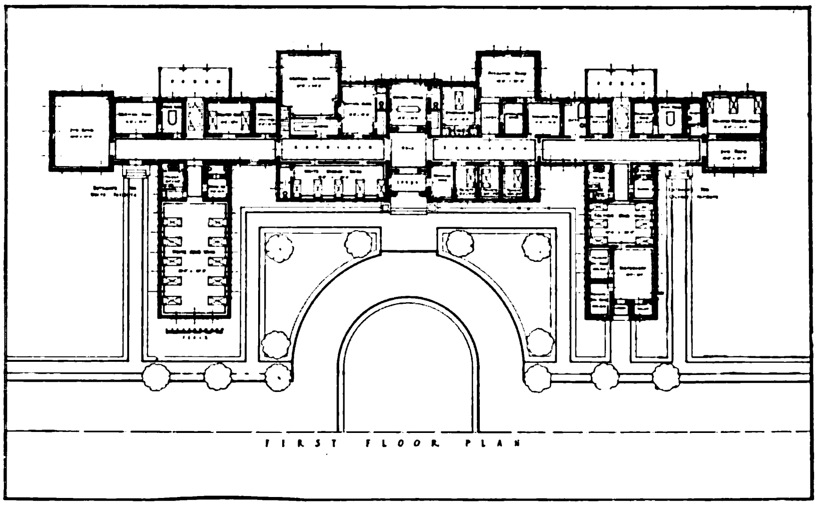
This is one of a number of carefully planned compositions which will produce interesting street pictures and provide adequate settings for the various buildings. The placing of these more important buildings at points of vantage in the town plan will also do much to obviate the monotony which might result from too numerous repetition of comparatively small units. This grouping will at the same time produce variety in height for, with the single exception of the commandant's house, this will be a town of one-story dwellings.



Floor Plan of Community Building

Buildings Number Several Hundred

The present contract calls for the construction of four hundred houses besides the numerous buildings of special type. The houses have been designed in seven types, so far as external appearance is concerned, though the plans of several of these apparently different houses, are in fact, identical. Compared with the majority of homes in workingmen's villages, these houses strike one as by the spaciousness with which they are planned. This impression is heightened by the fact of having all the accommodations of a goodsized house on one floor, which again emphasizes the advantage of having ample space on the lots. It is distinctly an arrangement for use in cases where the original land cost is small, and a large lot may be assigned to the individual householder without making the original cost and consequently the rent unduly high. In this case the original cost of the land was so low as to become practically a negligible quantity.



Floor Plan of Hospital

The smallest type is one of five rooms, three of them bedrooms. One of these opens from the living room so that in small families it may be used as an additional day room, parlor, library, or what you will.

Mr. Veiller has recently called attention to the stock size rug as a standard for bedroom dimensions. He spoke only of the 9 x 12 size, which applies in a majority of cases only to the largest of the rooms. It may be permitted to extend the note to include the next size smaller rug (8 feet 3 inches x 10 feet 6 inches), which is the size most usually laid in a single bedroom. Even that size is too large for the minimum rooms accepted under the government standard of 80 square feet.

Other types have the usual trio of rooms for living purposes instead of combining the living and dining-rooms, as in the case of many houses in other developments now under construction. The type assigned for use by the four majors is an L-shaped block containing seven rooms and bath. The same spaciousness prevails here, with an exceptionally good separation of the working portions of the house from the sleeping quarters.

The commandant's house dominates in size as well as in position. Its length of nearly 100 feet permits the inclusion of a guest's suite on the first floor, so that the second may be reserved solely for family uses. This house is further exceptional in possessing a cellar, which has in most of the houses been omitted.

It seems that in this nitrate plant, which will be operated directly by the Government, the proportion of military population will be unusually large. This includes many officers, but also a considerable number of enlisted men, many of them skilled chemists, for whom living accommodations of high standards must be provided. A three-shift civilian guard is accommodated in a building, more like a college dormitory than a soldiers' barracks, which really affords a combination of hotel and club life that would be hard to match outside a government plant. Each shift comprises about thirty men, and in designing the building each floor was made a complete unit to avoid disturbance during guard change.

Besides these quarters there is special provision for unmarried officers in the community building, which furnishes in addition to sleeping quarters many features of club life. A single room is allotted to each man and the building will be occupied in addition to officers, by executives and heads of divisions, together with official visitors.

A Well Equipped Hospital Provided

A well equipped hospital, to be maintained by the government, is a part of the first building program. This will take care of all classes of patients, young and old, including a wing for negroes. Grouped near by are houses for the doctors, and a home for the nurses. We have already noticed in passing that a large community garage for use of commissioned officers, is to be built, instead of a great number of tiny individual garages. It will be a great gain for the appearance of the neighborhood, at only the slightest sacrifice in accessibility because of its central location.

Besides these buildings of a semi-public nature there is the school, which contains, aside from usual classroom features, a corridor 12 feet wide. This will be used as a part of the regular school equipment, and not, as ordinarily, for a passageway and nothing more. The school also contains the auditorium, a comfortable room 42 x 52 feet, with stage and dressing rooms.

The public utilities for the community are of new construction built for this purpose rather than extensions of existing facilities. Sewers, for example, are laid throughout, connecting to septic tanks, from which the effluent will discharge through Spring Creek into the Tennessee River. Electric light for street and house lighting will be supplied from the plant. Water supply will be secured from wells driven on the property.

Substantial Character of Structure

The construction of the houses is as substantial as their planning is ample. Exterior walls are in no place of frame, but of hollow tile blocks, upon which is applied the stucco, which forms the surfacing material throughout. Floors, beams and rafters are of wood, as are interior partitions, but the roofs are to be covered with some form of tile which will render the exterior of the houses fire resisting to a high degree. From the view-point of the community this reduces the danger of general conflagration to a minimum. On the other hand, the unity in construction, in roofing and in material of exterior walls has given the architects a very exceptional opportunity to produce a homogeneous design which will lack nothing in variety of form, but should prove of the greatest value aesthetically to the completed town. The houses are all electrically lighted, and have complete plumbing installation. The matter of heat is, fortunately, not essential in Alabama. These houses are, accordingly, provided only with open fireplaces in the living rooms. For the rest, all elements that enter into the construction or equipment are in every way abreast of or ahead of the forward march of industrial housing standard, and gives promise of a development which will be unique among the government towns.

Description of Buildings Erected At Sheffield

IN the construction of the buildings at Sheffield, the architects were not hampered or limited in their design or the choice of building material to be used. Owing to the general climatic conditions prevailing in Alabama and in keeping with the customs and traditions of the south, a design was practically originated, being somewhat on the order of the California mission type of architecture.

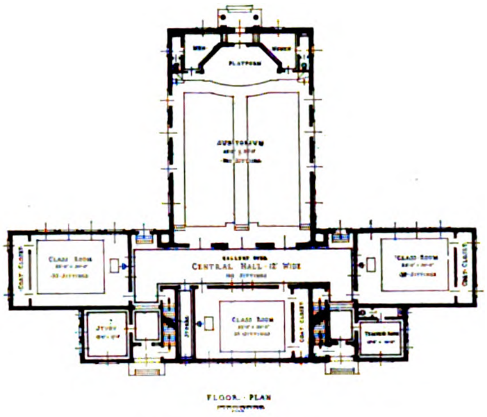
This design involved the use of hollow tile with stucco exteriors, a type of construction which offers the features of insulation against weather conditions, permanency, attractiveness and adaptability of design. The houses shown herewith are the more pretentious types, the average house being of four or five rooms. All houses with the exception of those shown are of the one-story bungalow type, many of them having the same floor plan but with widely varying elevations. By the careful planning of the streets and placement of the houses, the best possible advantage has been taken of a naturally picturesque setting. The village lies on a long slope, swinging down into the broad curve of the river.

The design of the houses shown herewith is characteristic of the various types in the village, although more pretentious, and an analysis of the various facilities provided will prove of interest to those who are planning houses of a similar character. In planning these houses the fact that sleeping and living quarters are on the same floor has made necessary a most careful arrangement of rooms. In the commandant's house the service and dining quarters are maintained in one wing while the opposite wing constitutes a complete guest's apartment, the two being separated by living room and enclosed porch. In this case the master's sleeping quarters are on the second floor with small enclosed porch.

A particular feature of the designs used for the houses at Sheffield is that of the employment of simple straight lines in laying out rooms. This precaution in design invariably results in a saving in construction. Another feature is that of porch space, it being realized that much of the life in a warm climate is out of doors. For this reason large porches are provided, which has the additional advantage of increasing the size of a house through the simple expedient of carrying out roof plans and providing porches which are practically additional rooms.

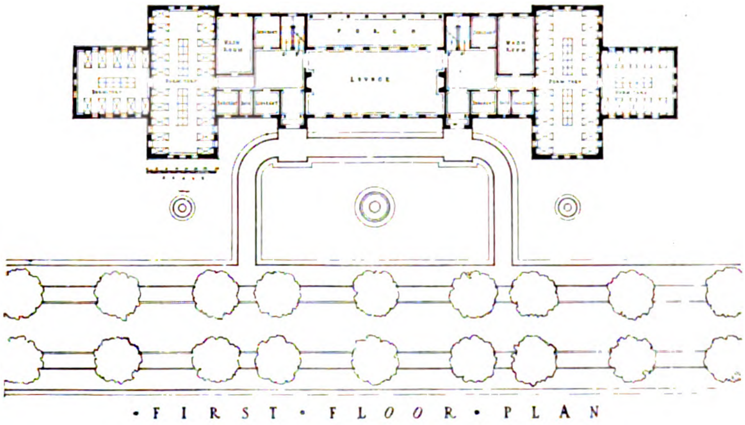
Careful study has also been made of the ventilation problem and the placement of windows has been made with relation to interior passage ways in such a manner that continuous circulation is certain. An added feature of particular value in a group of houses of this type is that they are conflagration proof. The exterior walls of tile and stucco are certain fire stops while roofs of tile are proof against the invasion of fire from without. In building a group of houses it has been found wise to consider the question of conflagration hazard and to provide either fire resistive exteriors or at least, if frame houses are used, to cut the village at various points with open spaces such as parks and grounds for public buildings, and to provide here and there a row of masonry houses which may act as fire breaks in case conflagration sets in.

In general the houses provided are of types which should prove particularly interesting to the prospective home builder. In these designs will be found good examples of economy of space, convenient arrangement and simple economical building lines.

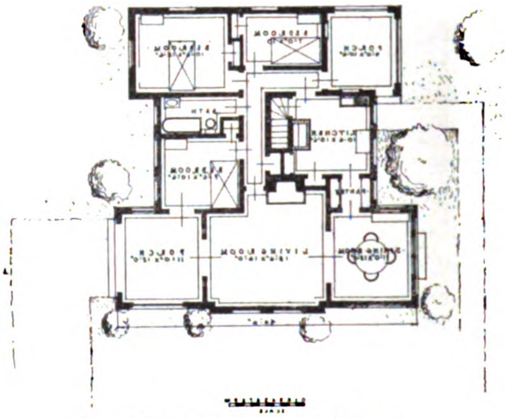


Ground Floor Plan

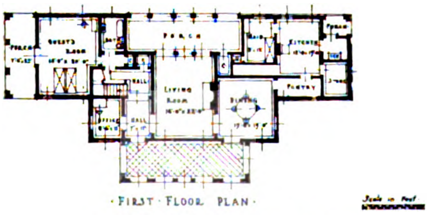
Commandant's House at Sheffield



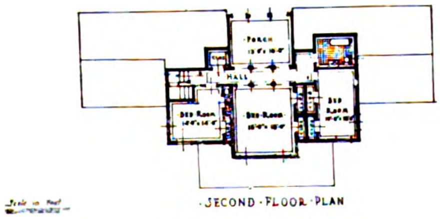
Floor Plan of Barracks at Sheffield



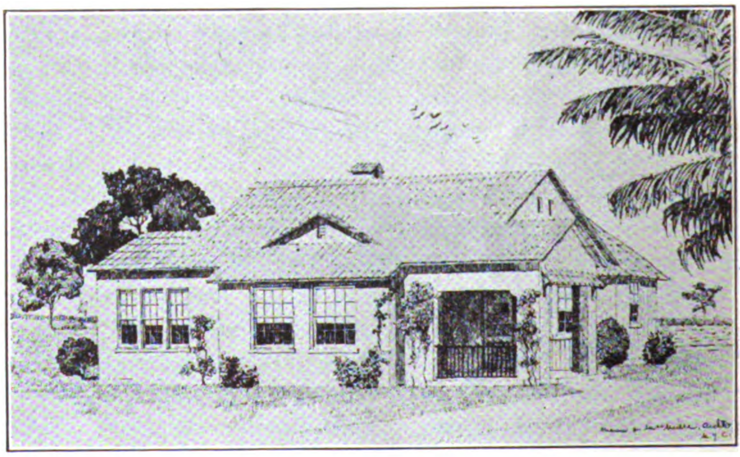
Floor Plan of Average House



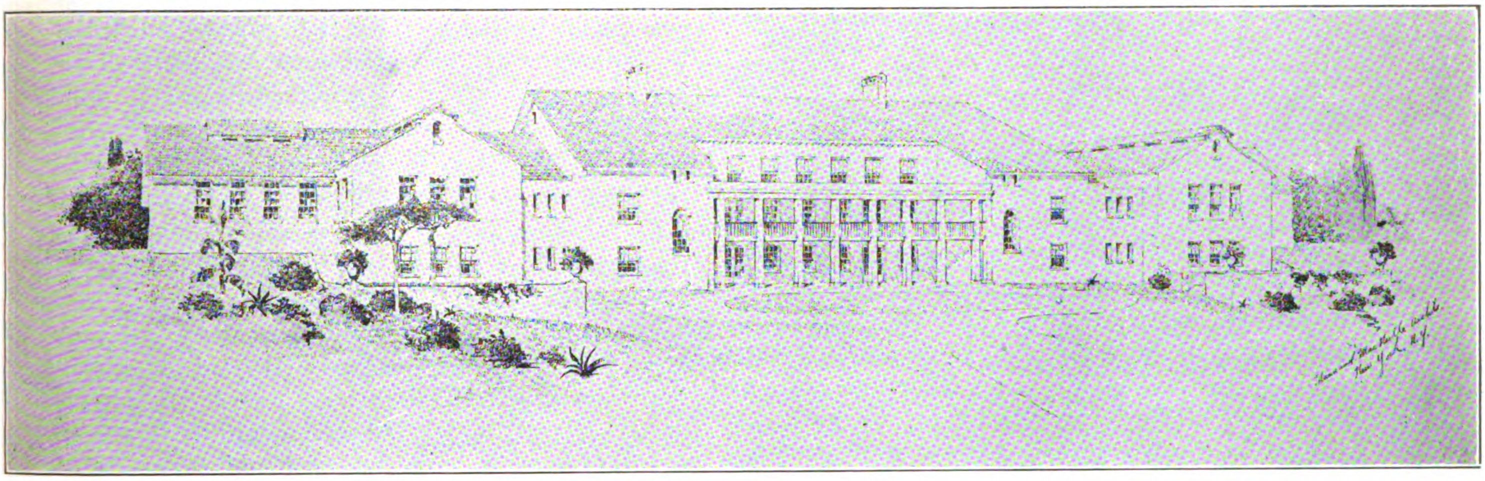
Floor Plan for Bungalow



Second Floor Bungalow Plan



Typical Stucco and Tile House at Sheffield



Barracks at Sheffield—A marked improvement upon the average building for quartering troops.

Own-Your-Own-Home Campaigns

STIMULUS has been given the Own-Your-Own-Home movement through the difficulty experienced by men of modest means in securing desirable living accommodations. The practical cessation of house building during the past two years, both in urban and suburban communities, has sharply limited the supply of available properties, with the result that rentals have increased by leaps and bounds, and in not a few communities landlords are taking advantage of the situation and are forcing tenants to buy properties that under normal conditions they would not dream of doing.

Within a recent period eighteen cities have organized district campaigns for home building along lines suggested by the United States Department of Labor. Campaigns either are in progress or about to open in Billings, Mont.; Charleston, W. Va.; Chicago, Ill.; Cleveland, Ohio; Denver, Colo.; Jacksonville, Fla.; Johnstown, Pa.; Lynchburg, Va.; Middletown, Conn.; Milwaukee, Wis.; Philadelphia, Pa.; Portland, Oreg.; Salt Lake City, Utah; Seattle, Wash.; Spokane, Wash.; Staunton, Va.; St. Paul, Minn., and Toledo, Ohio.

In each of these cities there is a determined shortage in dwellings and the Own-Your-Own-Home campaign is being waged as a civic movement with the cooperation of every organized element interested in municipal and social problems.

In sixteen other cities tentative plans are under way and from them will come, doubtless, many more vigorous campaigns for home owning and home building. In all these cities the club women, the clergy, financial interests, municipal officials and the labor organizations are being appealed to by the U. S. Department of Labor to do their utmost in assisting the campaigns to get under way. In the cities where campaigns now are on the women are proving invaluable as missionaries for the "Own-Your-Own-Home" gospel.

Since labor is so importantly involved in the home building projects, labor organizations are being invited and urged to take a conspicuous place in the campaign work in each community. Most of the homes built in this sort of a movement are for laborers and salary earners and the building of these homes provides employment for the building trades and common labor. There is, therefore, a double benefit in the home building and owning movement for labor and, through its organizations, in most localities, it is cooperating with enthusiasm.

Government Survey of Building Conditions

DURING the war about one-third of the country's industrial capacity, including man power, was diverted to war production. To bring about this great diversion of industry two means were employed: stimulation and curtailment. Stimulation was practiced throughout the war and affected the prices of materials and the wages of labor because Government contracts were awarded on a basis which permitted contractors to compete successfully with non-war manufacturers for materials and labor.

Curtailment was not important until early in 1918, except for the orders of the Fuel Administration and the Railroad Administration, for the purpose of conserving fuel and transportation, and certain priority orders.

But in a statement of February 5, 1918, Secretary McAdoo requested that homes should not be built except in case of urgent necessity. The statement contained by implication the premises on which the radical curtailment of the building industry was later carried out, i. e., (1) that conservation of materials, labor and credit was necessary in order to win the war and (2) that the conservation must take place in those industries that were not essential, or only in part essential, to the winning of the war. Some time after the publication of Secretary McAdoo's statement, the policy of seriously curtailing non-war production was put into effect. Eventually the production of sixteen building materials was cut down 25 to 60 per cent. Non-war construction was greatly restricted until it was almost completely stopped from September 3, 1918, until the armistice was signed. It was estimated by the Chief of the Building Materials Section of the War Industries Board that the non-war construction in 1919 would be not more than 10 per cent. of normal. This estimate indicates how great the diversion of labor and capital from the construction industry had been.

The stimulation of war industry and the curtailment of non-war industry was mainly carried out directly or indirectly by the Capital Issues Committee, the War Industries Board, and the War Labor Administration. Not only were prices of building materials affected by the stimulation of war industries, but in many cases also by direct price fixing. The same was true of the wages of labor. The power of the Government was exercised toward the lowering of prices of materials and the wages of labor in non-war industries in order to prevent labor and materials from being drawn away from the war industries.

This brief sketch of the Government's policy in stimulating war production and curtailing non-war production explains the difference between the cost of labor and of materials in the building industry and the cost of labor and of materials in general which was found to exist at the close of the war.

At the close of the war the index number of building materials, not including steel, had risen only 61 per cent. over the pre-war prices of 1913, while the index number for commodities, exclusive of building materials, had risen 113 per cent. The average increase of wages in the construction industry in forty-one leading cities from 1914-1918 was only 28.5 per cent. as against a rise of 94 per cent. in commodities. When the armistice came, there was, of course, a great volume of deferred construction projects, partly in the form of public works, partly in the form of semi-public utilities, partly in the form of housing and of commercial and industrial buildings. This volume of deferred construction represented in large part the curtailment of non-war production which had resulted from the diversion of one-third of the Nation's industrial capacity to war production.

Fortunately the return of peace did not mean the complete, abrupt end of war production, yet it threatened serious unemployment. In order to minimize unemployment during the period of economic readjustment, the Government promptly removed the restrictions which it had imposed upon the construction industry. There is one indirect restriction, however, which it has not removed, and could not remove, that is the moral obligation of the financial community to conserve credit until the Victory Loan is floated. Each bank, trust company, insurance company, etc., must estimate how large a part of its prospective allotment of the Victory Bonds it can sell promptly, and, consequently, how much of its funds it can afford to set aside for real estate loans and other purposes. The proportion so set aside for real estate loans will depend largely on the element of optimism which enters into every judgment concerning the future. There probably never was a time when broadly speaking optimism as regards industry was better justified or meant more to the country than at present. It is distinctly encouraging to the construction industry to note that optimism—reasoned optimism—is most emphatic in the literature published by the leading banks of national reputation, compiled for them by trained investigators.

Evidence of a helpful attitude on the part of banks towards real estate is not wanting. In the great borough of Manhattan, in New York City, mortgages aggregating $8,500,000 in value were extended (renewed) in January of this year, as against $2,800,000 in January of last year. That is to say, the banks and insurance companies are not now, as they were a year ago, calling upon real estate borrowers to pay off loans in whole or in part.

Furthermore, 13,500 building permits were issued in 152 cities this January as against 9,600 permits a year ago. The average value of the January permits this year was $1,700, compared with $2,800 in January, 1918. A year ago, it will be remembered, the Government was building extensively, and, besides many factories were being erected for war production. Fifty-four per cent. of the cities showed gains in building this January over the preceding January. It is to be noted also that January, 1919, gained over December, 1918, although building permits are normally fewer in January than in December. The significance of these building figures is that there is a tendency to build extensions, to make structural repairs, and to erect inexpensive buildings, including particularly housing. The figures bear the characteristics one looks for at the beginning of a revival of the building industry.

It takes time for private building to get under way, and still longer for public works to get started in volume. However, the reports received from State, county and municipal officials justify the belief that an exceptional amount of public construction will be undertaken this year.

The turning of the tide in the construction industry that we have all been looking for since the armistice has unquestionably come. However, there are still obstacles in the way of its rise to normal. The most important of these is the high cost of construction as compared with the pre-war period. Not a few bankers and investors decline to consider a building project today merely because of the high cost of construction. Those who take this attitude do not generally stop to analyze the high cost of construction which alarms them so.

Although construction costs are higher now than in 1913, the union wage scales in the building industry have not advanced as rapidly as have the cost of living, while building material prices are not as high as are commodity prices. Wage increases in the construction industry, speaking generally, lagged behind because that industry was utilized to only a small degree in war production. The level at which the cost of construction stands today has been pushed up only slightly by temporary war conditions. It has been fixed mainly by conditions that cannot be materially changed for years to come—by the tremendous expansion of money and credit.

During the war the volume of money and credit increased far more rapidly than the volume of industry and commerce, hence prices rose. But expansion of credit through Government loans is a world-wide condition which must hold up prices everywhere until the Government debts are largely discharged.

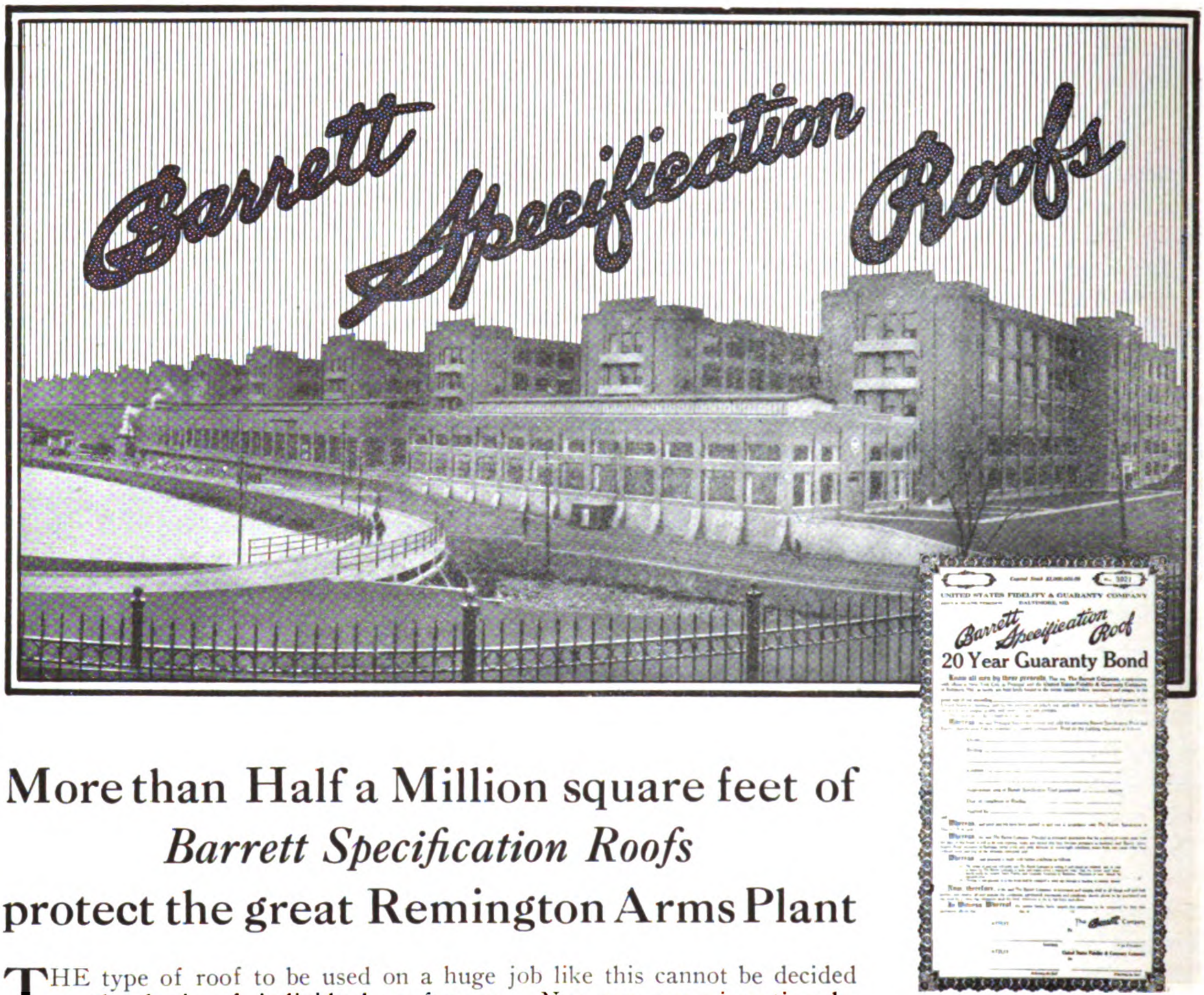
The fact is that the cost of construction is not high today. It is low compared with food, clothing and commodities in general. It is high only in comparison with its own pre-war level. Commodity prices will undoubtedly recede because food and clothing and many other things were affected by special war conditions, for example, scarcity of transportation which prevented shipments from distant countries to the Allies. But they cannot fall to the pre-war level.

But, although some readjustments in the wages of individual trades and in the prices of individual classes of building materials may take place, the cost of construction will not come down to such an extent as to endanger a judicious investment made today in the erection of a new building. Where the rents offered will show a fair net return on the cost today of a new building after deducting a reasonable sinking fund allowance, no one should hesitate to build or to lend money for building.

Rents are determined by supply and demand. In the case of housing, during the early part of the war, the demand was curtailed by the rapid advance in commodity prices, which impelled many tenants to crowd into or get along with less space than their normal standard of living required, and by the drafting of the young men of military age. Within a year, however, these influences had spent their force. By the end of 1919, according to the replies obtained from a questionaire sent to real estate boards in 91 cities, only four of these cities had a housing demand that was below normal, while in 52 cities rents had advanced 10 per cent. or more, in some instances 40 to 50 per cent. This rise in rents took place at a time when the population at home was as economical of house room as possible, and while several millions of soldiers were absent in the service.

Another important fact was disclosed by the replies to the questionaire, namely, that despite rising rents for housing in the majority of the 91 cities, the market values of house sites had declined in six cities, and had remained practically stationary in 72. The market value of land is, like rents, determined by the interplay of supply and demand. During the war the demand for city land was relatively small, because dealing in real estate was discouraged by the bank as a non-war activity requiring the use of credit. With a restoration of easier mortgage loan conditions, the demand for real estate will inevitably increase; nothing can seem more certain than that in our growing American cities the market value of land must advance briskly.

A judicious investment in the erection of a new building does not depend solely on the cost of construction. It may well happen that the man who buys a lot today and builds on it a house the cost of which is not greatly out of proportion to the cost of the land will be better off a year from now than he would be if he had left his money in the savings banks in the meantime. City land at present is least inflated of all material wealth.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United States Fidelity & Guaranty Company
Barrett Specification Roof
20 Year Guaranty Bond

This is the bond that guarantees your roof for 20 years

More than Half a Million square feet of *Barrett Specification Roofs* protect the great Remington Arms Plant

THE type of roof to be used on a huge job like this cannot be decided on the basis of individual preference. Nor can experimenting be tolerated. For the investment is too large and the consequences of a mistake are too serious. When architects and engineers face a roofing job like this they have to get right down to *proved facts and figures.* They have to be absolutely *sure* on four points.

***First*:** That from start to finish **they** will get just the kind of a roof they specify, with no chance for "skimping" or substituting inferior materials.

Second. That the manufacturer of the roofing materials is thoroughly reliable, and has had long and successful experience in the roofing business.

Third. That the roof will positively be trouble-proof and free from maintenance expense for a long period of years.

Fourth. That it shall be the most economical roof possible to obtain, not as to first cost, but, what is of greater importance, as to **cost per year of service.**

Because Barrett Specification Roofs meet *all* of these requirements better than any other type of roof, they were selected to cover these great buildings.

Today the *standard* covering for permanent buildings is a Barrett Specification Roof. It takes the base rate of insurance. It costs less per year of service than any other type of permanent roof. It is guaranteed for 20 years.

The 20-Year Guaranty

A 20-YEAR Surety Bond is now offered on all Barrett Specification Roofs of fifty squares and over in all cities of 25,000 population and more, **and in smaller places where our Inspection Service is available.**

This Surety Bond exempts the owner from all expense for repairs or up-keep on his roof for **20 years.** It is issued by the U. S. Fidelity and Guaranty Co. of Baltimore, one of the largest Surety Companies in America.

Our only requirements are that The Barrett Specification dated May 1, 1916, shall be strictly followed and that the roofing contractor shall be approved by us and his work subject to our inspection.

Thus, in spite of the fact that we do not build roofs ourselves, we are put in a position where we can actually guarantee the delivery of the long years of service which Barrett roofs are capable of giving.

Barrett Floor and Foundation Water-proofing

Barrett materials were used not only on the roofs of the buildings of this great plant, but also to water-proof the floors and foundations, 264,600 square feet of Tar-Rok Flooring; 966,000 square feet of two-ply floor-water-proofing; 126,800 square feet of foundation-water-proofing.

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The Fireproofing News

CONTAINING DETAILED DESCRIPTIONS OF NEW DEVICES AND APPLICATIONS OF MATERIALS WHICH ARE OF REAL VALUE IN FIRESAFE BUILDING: ALSO NOTES ON THE LATEST BOOKLETS, CATALOGS AND OTHER FIRESAFE LITERATURE, WITH OTHER ITEMS OF INTEREST TO THE FIREPROOFING FRATERNITY

LATEST EDITION

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New York City, N. Y., March, 1919

Priceless

Look for Quick Revival in Building Activity

Government, banking, manufacturing and distributing interests are merging their influences to bring about a quick revival of building construction, according to the Dow Service Daily Building Reports.

Federal pressure on building material price commodities resulted last week in a 55-cent drop in the price of Portland cement delivered in New York. At the same time price adjustments in many other supplemental lines became effective, all with the one object of putting the building construction cost factor within the reach of the investor. Simultaneously, United States Senator William M. Calder, with the co-operation of Justus Slater, Jr., the building economist, Major Frederick Hyde, of the American Bankers Association, M. W. Harrison, of the Savings Bank section of the same association, important officials of the Federal Reserve Bank and Franklin T. Miller, supervising director of the United States Department of Labor, discussed the matter of the immediate establishment of a National Building Bank to be operated under the existing banking laws and as a part of the Federal Reserve banking system through which greatly improved facilities might be provided for the removal of restrictive features of the present building loan system, not only for the present emergency, but to place building financing on a definite basis such as is provided by other forms of commercial banking.

Conferences were held with the purpose of bringing about an immediate realization of this important factor in the building industry, prior to which it was explained that the proposal is in no sense a real estate bank as the purposes of the institution, which probably will be established, are not allied with the real estate market or its development in any way, it merely being an official established Government branch of the Federal Reserve system, whereby temporary loans on well secured building operations may be obtained without excessive fees for various brokers. Senator Calder and Mr. Slater believe that with the establishment of this functionary in the building industry the principal factor of delay in building construction will be immediately eliminated.

The conference was informed that if the proposed banking system could not be perfected under the present banking laws, and that legislation would have to be awaited before it could become an actuality, the emergency will have passed and the benefits to be derived from removing the present stringency of temporary building loan money would be nil. It has been necessary, therefore, to obtain the endorsement of important organizations in the project, and among others that have taken it under active consideration are the Merchants' Association, the Chamber of Commerce and several important building interests. It has been learned that the present banking laws and war emergency measures give ample powers for the establishment of such an institution without awaiting the enactment of special laws.

To help meet the increasing demand for new construction and to permit building work to get started at once, the building material dealers of New York decided to give the customers the benefit of the price cut in Portland cement that was arranged with the Industrial Board at Washington. There was a drop of 15c. a barrel in Portland cement and a change in the rebate price on empty bags. This latter factor does not affect the consumer, it being merely a bookkeeping charge between the dealer and the manufacturer. The drop of interest to the consumer, therefore, amounts to 15c. mill, which works out to a reduction of 55c. a barrel, a price shrinkage that is held to be artificial, especially since manufacturing costs probably have not reached their high level, and the potential demand is much greater than the present market indicates. One important manufacturer of Portland cement, by way of illustration, sent orders to his plant to push production to full capacity. The present price of Portland cement in this market, therefore, is $3.25 a barrel, delivered, as against $3.80 a week ago

A Concrete Freight Car

Following the concrete ship comes the concrete freight car, which latter is a radical departure in railway equipment. The initial car, built for the Illinois Central Railway, with the sanction and co-operation of the Federal Government, is of fifty tons capacity. Of a steel skeleton body mounted upon a steel underframe, the walls and floor of the car are of reinforced concrete, applied with a "cement gun." So successful was the car under the numerous tests to which it was subjected, that plans are already under way for the manufacture of concrete cars in quantities.

Steel Specialty Manufacturers

A recently formed corporation, the Lawton and Stephens Company, Inc., of New York City, is planning the manufacture of steel window frames and other fire retardant devices in connection with building construction. Messrs. Lawton and Stephens were long associated with the S. H. Pomeroy Company; know every phase of window construction and have an extensive acquaintance among the architectural, engineering and contracting fraternity. With abundant shop facilities and an efficient selling organization the new company promises to soon become an important factor in its particular field. Walter D. Ferris, a well-known business man, is secretary-treasurer of the Lawton-Stephens Corporation.

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Cleveland
Museum of Art

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This reproduction in cement of the beautiful quarried product of Old Normandy is coming into great favor.

As backing for it nothing surpasses

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A less perfect lath will soon ruin a product of such delicate color and texture as caen stone.

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Fixing Prices for Definite Periods

Among the sensible suggestions offered for stimulating business throughout the country is that put forth by the Lakewood Engineering Company, of Cleveland. From a letter addressed by its management to members of war service committees and business executives generally we quote with unreserved approval the subjoined:

"If the value of things people buy were established in the minds of the people would there be the hesitancy in business we are now facing?

"The individual producer is the one to say what price he must receive for his wares. His business judgment will not permit him to ask an excessive profit (that would invite competition and perhaps excess production with destructive results), and he certainly dares not quote prices which cannot return proper compensation to the capital and labor invested in his product.

"Satisfactory sales are based on confidence between the buyer and seller.

"It is our belief that prices made effective for specified periods or seasons will establish confidence in prices.

"We are therefore telling our buying public what our prices are and that there will be no change for definite periods. To make the plan effective, we have deemed it advisable to make price periods of not less than six months.

"If every producer who is not already doing so will adopt this plan, making his prices known to the public by advertising as well as by individual quotation, we believe that confidence will be restored and that the present enormous potential demand will be brought into action. Perhaps the best examples of this published, open-price plan are:

1—The retail drygoods business of the country whose prices are known to every individual through publication in advertisements and through tags on the goods in the stores.

2—The automobile industry which once every season names its price to the public for that season so that every individual, possible customer or not, is made familiar with the value of the article.

"These two industries are perhaps the only two large industries whose business has been and is now active since the armistice.

"If the manufacture of cement, of steel, producers of lumber and other building materials, manufacturers of clothing, food products and machinery, had followed this Published-Price-for-the-Season method and the prices of these commodities were established in the minds of the public, there would not now be the marked halting in business.

"If you agree with this reasoning, will you not reply to this letter saying that you will assist by every means at your command to induce your company, your industry, other businesses and industries to help stabilize business promptly by adopting a plan of action over this slogan—Prices Effective for Specified Periods or Seasons Will Establish Confidence Between Buyers and Sellers."

Cares for Safety and Comfort of Its Employees

Maintaining that an employing corporation owes a duty to its employees beyond the mere payment of wages to them, the Kohler Company, of Kohler, Wis., extensive manufacturers of lavatory fixtures, recently completed the erection of a fine living and recreation building for the use of its several thousand workers. Designated the "American Club" the structure was erected "for the purpose of Americanizing the men of foreign birth" in its service, and supplying them with attractive and thoroughly hygienic living accommodations.

From plans prepared by Richard Philipp, of the Milwaukee architectural firm of Brush and Philipp, the style of the new building, which is 316 feet long, harks back to the later Gothic form of construction, with its steep roofs well adapted to shed the snow of our long winters. The roof itself is of the most beautiful of slate, the mixture of green and purple, the thickness of the slate giving it a texture and softness of effect not to be obtained with any other roofing material.

"The walls are of rough brick, interesting in texture, while the beauty of the color is enhanced by the contrast with the white outside trimmings and cornices and the green color of the roof.

"The exterior well expresses the plan, which a building should always do. The numerous dormers are indicative of the many single rooms; the large south wing indicates the extensive dining room accommodations, while the main entrance and lounging room are suggested by the central group of two gables. Beyond the dining room is the separate wing of the kitchen and service portion of the building.

"The setting of the building has been carefully considered, being placed to face an extensive plaza planted with trees and shrubs to obtain the most artistic effect, and also avoiding a too close proximity to the street. The white walks and drive-ways, set in green, furnish a fitting foreground. The place has an inviting aspect, suggesting cheerful, home-like comfort."

Building Activity at Tampa, Fla.

Business firms are looking for an early return to normal conditions in building lines, and since the first of the year many plans have been drawn and bids sought for industrial purposes; already a number of projects have reached the point where bids will be awarded very shortly and before the year is half gone it is expected that the city will have started one of its greatest eras in building activity.—"Tampa News."

In an effort to stimulate a greater demand for galvanized iron cornices, a special committee of the National Association of Sheet Metal Contractors has been named by President George Harms.

Harvey S. Owen, a well known engineer, will represent the Lime Association in the Middle West. He will maintain headquarters at St. Louis.

The variety of uses to which the self-centering products of the General Fireproofing Company may be put is interestingly set forth in the booklet lately issued by the corporation, copies of which may be had upon application to the head offices at Youngstown, Ohio.

From the latest booklet of the American Steel & Wire Company, New York City, those interested in building problems may learn much of value concerning its system of triangle mesh concrete reinforcement.

Although the 1918 business of the Yale and Towne Manufacturing Company, makers of builders' hardware, increased heavily over that reported for the previous year, the net profits of the corporation were $28.18 a share, as against $40.21 per share earned in 1917. The total net earnings of the corporation last year were $4,088,015; though this was heavily reduced through various charges and Federal taxes.

Cornice Beads

A popular form of metal lath is that manufactured by the Milwaukee Corrugating Company of Milwaukee, the product of which has been tested for years and has proven its worth. Leaflets issued by the company may be had by architects and others contemplating building.

Du Pont Products

Few people have an appreciation of the variety of products manufactured by E. I. du Pont de Nemours & Company of Wilmington, Del., the average man associating the corporation merely with the making of high explosives, for which it has been famous for over a century. For the benefit of those interested the du Pont company has issued a 236 page book, describing and illustrating its products, which range from dynamite shells to wood varnishes.

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If you are a Manufacturer of Firesafe Material or Protective Devices,

consistent presentation—in season and out—of your product in CONSTRVCTION cannot fail to result favorably because the success of this publication depends upon

(1) how well it advances and proves the argument for proper fireproofing

and

(2) what it actually accomplishes to increase the use of firesafe materials and devices.

The first objective is attained (intensively) through the editorial, news and advertising sections of CONSTRVCTION and (extensively) by sending the magazine over the entire country to all the business and professional interests related to building, planning, construction, equipment and maintenance.

The second purpose is accomplished by **actively fighting for legislation favoring firesafe construction** and against laws permitting the continued use of wood—and remember that no company can do this work as effectively as a publication, that the "fireproofing fraternity" at present is a composite unorganized body comprising a number of separate units representing more than a dozen industries, that there is practical need of a national mouthpiece such as you have in CONSTRVCTION, that **makers of fireproof materials are now getting but one per cent. of the business which ought to be theirs**, that advertising in CONSTRVCTION is helping yourself to get more orders, giving your goods the representation they deserve—and according this publication the cooperation it merits.

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Why Compromise With The Window Problem?

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The Pomeroy line of fire retardant windows includes more than 20 standard types—each developed and perfected to meet a specific combination of factors in the window problem—each the embodiment of highest window efficiency in its particular type.

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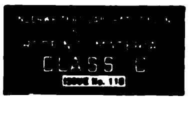
Reynolds Shingles have a top surfacing of granulated slate, granite, etc., and they positively will not ignite from flying sparks or brands. Where fire originates inside the building they have a marked blanketing influence.

We call them "Safety First" because they protect from rain or storms, from heat or cold and from the common agencies which spread fire.

Reynolds Shingles are the standard asphalt Shingles and you will make no mistake in insisting on Reynolds Shingles.



If your dealer cannot supply you write the factory.
H. M. Reynolds Shingle Co.
"Originators of the Asphalt Shingle"
GRAND RAPIDS MICHIGAN

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ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

George A. Watson, Editor
Ralph P. Stoddard, Associate Editor
Wm. Wallace Ewing, Consulting Eng.

Volume Eight **Number Five**

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Write for our book—"Written in Letters of Fire"—a text book on the subject of record protection. It contains valuable information and data that you should have. Get the facts about your own security—ask for your copy of this book.

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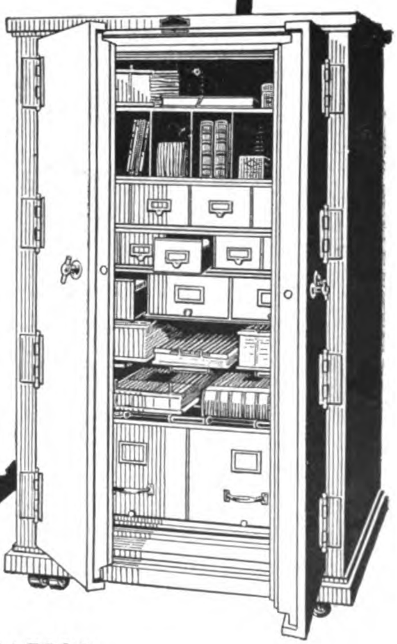

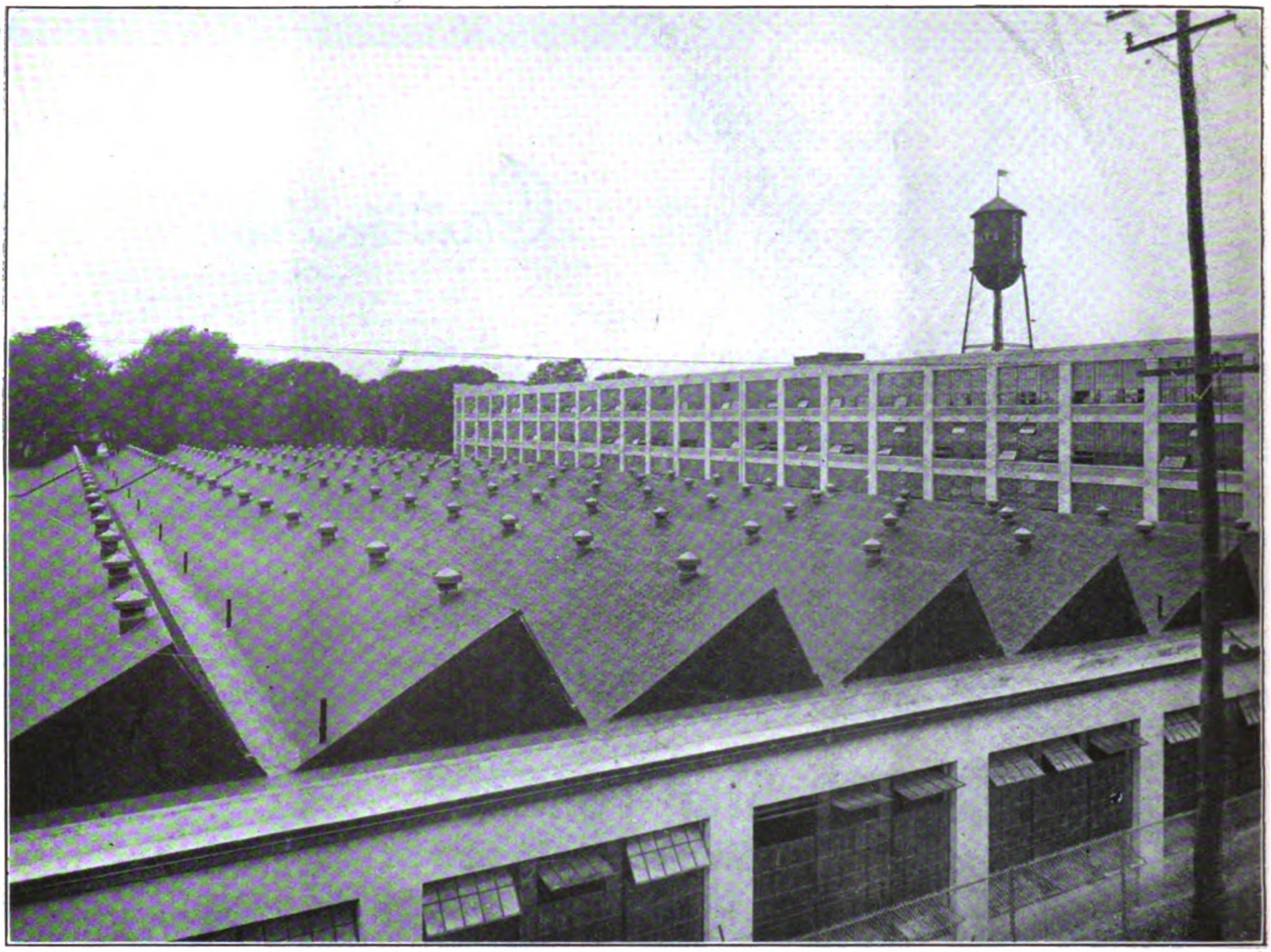

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If all factories were as well lighted by Daylight as this one, there would be no need of "Heatless Days"; no need of artificial illumination in the day time which requires so much fuel to maintain

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Let us send you samples of FACTROLITE and PENTECOR (in paper-weight form) and literature which will interest you

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CONSTRVCTION
ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

VOL. VIII MAY, 1919 No. 5

Would Aid Prospective Builders

TO assist prospective builders and their architects or engineers in so designing structures as to insure their compliance with New York laws, the Engineering Division of the State Department of Labor has for distribution a blank form (E-159), on which preliminary studies and specifications of proposed buildings, alterations or additions to existing buildings, plumbing layouts, etc., may be sketched and noted and submitted to it for examination and criticisms prior to the preparation of working drawings, or if the work contemplated does not necessitate plans and specifications, this form may be used in lieu thereof, and submitted in duplicate to the "Engineering Division, Department of Labor, Capitol, Albany, N. Y.", for examination and approval prior to starting construction.

This service is rendered by the State Industrial Commission in order to obviate the necessity of structural changes in a completed structure, when upon inspection by the Labor Department it is found that the building or alterations do not conform to the requirements of the Labor Law and Industrial Code.

Under the law of economic construction in the building of industrial plants, the greatest efficiency and economy is obtained only when the work is under the direction of a thoroughly proficient and experienced person. Efficiency is greatly hindered when a building is unsuited to its use, either due to conforming to the requirements of law or the particular industry for which it is planned; defects discovered after completion are usually expensive to remedy.

It has been the experience of the Engineering Division that some architects and engineers, in preparing their plans, either ignore the requirements of the Labor Law and Industrial Code, or assume their interpretation is correct, rather than sacrifice their professional pride and confer with those who are in a position to advise them. This fact is very forcibly brought out on the surveys of factory buildings by the Labor Department, resulting in the issuance of structural orders entailing no end of expense and inconvenience, and, of course, the condemnation of the Labor Laws, Labor Department and Inspector, when the cause of all the trouble and expense may be laid at the door of him who drew the plans and specifications.

It is just as essential to know the limitations on occupancy, the construction and location of toilet rooms, stairways, elevator shafts, etc., as required by statutory requirements of the Labor Law, in a building, as it is to know the number, type and size of machines required. All of these conditions and requirements occupy floor space, and the need of careful study and planning is self-evident.

The remedy is to submit plans and specifications in duplicate to the Engineering division, or if convenient, call at the office and confer with them on your proposed layouts. You will not only be rewarded by having a thorough study made of your propositions, and all requirements thoroughly discussed and explained, but also the advantage of the experience of this division in the study of some 3,500 plans of industrial buildings.

This division also maintains a complete file of catalogues on building and plumbing materials, safety devices and machinery, all of which is available to those who desire information on such subjects.

The services rendered entail no expenditure on the part of the applicant. Plans submitted, if they conform to the requirements of the Law and Code, will be certified and returned to the applicant, thereby assuring a compliance marking from the Inspector upon his inspection of the premises.

Afraid of Frame Roof Sheds

REPRESENTATIVES of the Federal Railway Administration and of the Seaboard Air Line Railroad Company are considering the erection of fire resistive sprinkler equipped sheds to replace the frame roof buildings at Hutchinson Island, off Savannah, Ga., destroyed by fire on February 15th last.

The sheds are intended to store great quantities of baled cotton, and it is most essential that their construction be highly fire resistive.

Suggests "Ready Made" Houses

IN the opinion of Grosvenor Atterbury, a leading architect of New York City, serious consideration should be given the "ready-made house idea, as a means of relieving the present insistent demand for homes for industrial workers.

Addressing the New York Reconstruction Commission, Mr. Atterbury said:

"In New York City alone $100,000,000 is annually spent on tenements and small houses out of a total of $150,000,000 for all of the construction in the city. An even higher proportion for home construction would hold true of the entire country. Two and a half billions is the rough estimate of our normal annual budget for home building. Why then do we fail to solve the problem of small houses on a commercial basis, when our great office buildings, factories, hotels and apartments keep pace with the public needs and pay good profits into the bargain? The explanation lies, of course, in the fact that the individual house is a product of disorganized, individual effort, whereas the great building is sufficiently important to justify careful organization and concentration of all the co-ordinate activities necessary for its production.

"It is organized construction against disorganized construction; co-operation against disjointed individual effort; to a growing extent, standardization against constructional chaos.

"It comes, then, to the question of whether there is any good reason why the industrial housing problem should not avail itself of just such modern methods of combination, co-operation, concentration and standardization as have produced such astonishing results in almost every other commercial activity in this country.

Protection Except in Housing

"It is a curious fact that the scientific and co-operative principles have been practically applied to the production of almost every item in the poor man's living account but the second largest single one—that of housing. His bread, his clothing and his watch are factory products, largely guaranteed—sometimes by the Government. His house is usually 'custom made' and bought at the mercy of a speculative builder. A proposal to clothe the destitute with garments 'made to order' would be laughed to scorn. Of stock patterns and sizes, clothing can be turned out in quantities at a fraction of the cost of individual manufacture. Yet we are enthusiastically trying to house our poor in 'custom made' tenements and are puzzled and worried when we find that in spite of most model planning the cost of the model dwelling fails to go down so as to bring its rentals within the means of the poorer laboring classes whom we wish to reach. In fact, in this respect we find it difficult to compete successfully against the ordinary tenement.

"Now the obvious solution appears to lie in the standardization, not necessarily of the general plan, but of its various component units and structural elements. Carried to its logical conclusion, as I believe it should be, this principle would result in a system of 'standard dwelling' manufacture, in 'ready-made' system, if you please, of wholesale fabrication like that which has already given the poor man his two dollar shoes and his ten dollar suit of clothes.

"The chief elements, as you doubtless realize, in the housing problem are first the prevailing rate of interest on capital; second, the prevailing rate of wages for labor; third, the prevailing standards of living; fourth, the cost of construction.

Elimination of Building Waste

"These factors in the equation fall into the relation in the form of a vicious circle, and while improvements in methods of financing, taxation and renting may act as palliatives the ultimate problem of the relation between a day's work and the quantity and quality of housing that it will secure for the worker will still remain substantially constant, except only we find one or more of these items in which we can eliminate waste.

"The investment of a few millions additional capital under duress on the basis of an interest yield below the market rate will accomplish little except perhaps to discourage the investment of other capital in similar enterprises. It would be just as logical and probably as effective in the end to call a meeting of those who need homes and persuade them to pay higher rents than they can afford so as to attract capital into housing enterprises, or again, to ask the builders to eliminate their profits so as to simplify the equation.

"Most experts agree that the real crux of the industrial housing problem lies not in the land cost, taxes or interest rates, but in the house itself—the cost of building construction. The investment in the building is anywhere from three to ten times the cost of the land and is, therefore, the dominant item and the most potent factor in the entire problem."

Mr. Atterbury said that the country is suffering from the lack of scientific building codes based on the latest engineering coefficients and practice. He referred to this lack as a "factor of stupidity."

"It may help to point my moral," he added, "when I tell you that whereas the building law requires us to use twelve-inch foundation walls for little houses in New York, we are today building houses of a similar type in Tennessee with walls only four to five inches thick, and I have not the slightest doubt but that they are amply sufficient for their purpose. In other words, the building code in New York forces us to waste two-thirds of our material."

Moulding Houses in Steel Forms for War Workers

By MILTON DANA MORRILL, Architect, 223 E. 17th Street, New York City

THE old saying that "Necessity is the Mother of Invention" has proved true in many of our war-time activities. We needed ships! We needed guns! We needed munitions, and to get these we had to have dwellings to house the workmen. Overlook Colony, situated seven miles north of Wilmington, Delaware, was in the midst of the field of war-work congestion. Houses were urgently needed for the workmen making munition chemicals. There was a scarcity of ordinary building materials, and transportation was a difficult matter even if these could be purchased.

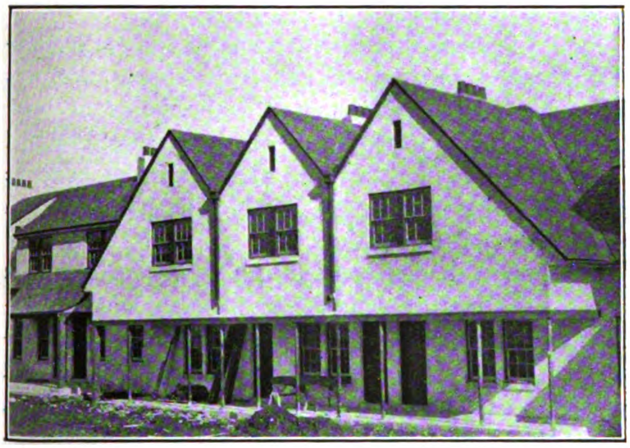


Fig. 1—The Three Gables Form a Central Feature in the Thirty-nine-House Group

Investigation showed that there was an ample supply close at hand of crushed coal cinders, ordinarily considered a waste product, for making cinder concrete. Samples were taken and test blocks made and the cinders were analyzed for sulphur, as a high percentage of sulphur affects the strength of the concrete. These test blocks showed a crushing strength of 1,800 lbs. per square inch, whereas in the ordinary house walls the load seldom exceeds 120 lbs. per square inch. This showed that cinder concrete, while it could not be expected to compare with stone concrete in strength, was still amply strong for light construction, such as house walls, and with the steel reinforcing rods imbedded in the concrete as the work was being done, these cinder concrete walls were far stronger and more substantial than the usual walls of brick or of tile construction.

Seventy-five houses were built of this cinder concrete construction at Overlook Colony. Speed of construction was considered especially necessary in this housing work. Part of the work was done in the usual wooden forms, but the lumber loss and the labor wasted in making the wood forms proved this to be an expensive construction. A method of moulding walls by the use of steel forms was employed on this particular group of houses. It is here illustrated and described how these steel forms were used over and over again for house after house. The work was done to a large extent by unskilled labor.

How These Concrete Houses Were Built

The steel moulds were set up on the concrete footings and filled, forming the first course of the concrete wall. The concrete was mixed about the consistency of oatmeal. Ten per cent. of Hydrated lime by volume of cement was added to the concrete mixture. The concrete was mixed in the proportion of one part Atlas Portland Cement, 2½ parts sand and 5 parts of cinders. As soon as the first lot of moulds were filled, it was found that the first blocks moulded were firm enough so that the steel plates could be taken off. These plates were then moved forward and again set up, making moulds to continue the foundation walls. As soon as the first course or belt of concrete was completed around the building, the plates were again set up on top of the first course and a second course of concrete started. This process was continued up, course after course, till the walls reached the height of the roof plate. When this point was reached the moulds were taken apart and ready to be moved to the next job. The speed with which the work was done depended upon the size of the steel mould equipment. The work at Overlook Colony was done with No. 3 wall-moulding outfits, shown in Fig. 3.

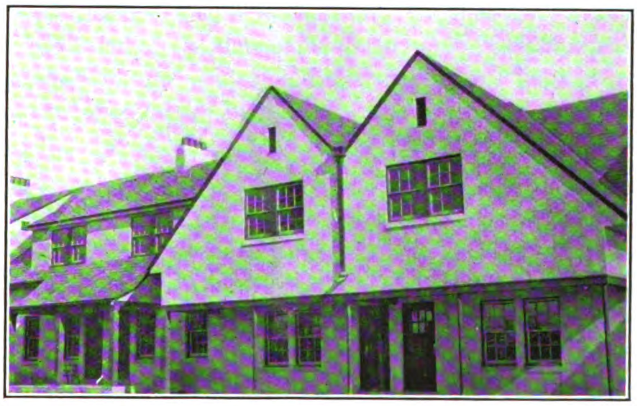


Fig. 2—The Two Gables Are Spaced so as to Break the Roof Lines of the Row

These steel moulds were simple to operate. The United States Government has utilized unskilled labor to put up many large buildings, using these steel moulds for the work.

Ten of these No. 3 wall-moulding outfits were used on the Overlook Colony houses. Each of the outfits were made up of twelve moulds. The cost of a complete house-building outfit of this kind is $200, but as these steel plates can be used over and over on job after job the cost per house is a small item.

It is not an uncommon occurrence to read of a village of houses being reduced to ashes, but it is somewhat remarkable to see ashes turned into permanent fire-proof houses. This has been successfully done at Overlook Colony and also at Nanticoke, Pa., where a group of forty fire-proof houses were designed and built by me.

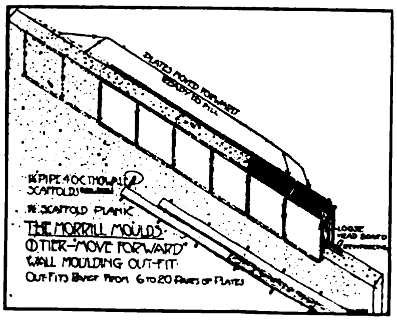


Fig. 3—Moulding Outfit No. 3

In the foundation walls of the Overlook Colony houses small stones from four to six inches were dropped into and imbedded in the concrete, as the moulds were filled. These stones displaced and saved from 30 to 50 per cent. of the concrete. When properly bedded these stones did not show on the face of the wall, but were entirely covered in the concrete.

In this process of building, instead of the blocks, bricks or tile being moulded at a factory and shipped to the job to be set by skilled masons, the blocks of concrete were moulded in place on the wall, which did away with all of the manufacturing, transportation, breakage in handling, cutting to fit spaces around windows and the time required by masons for setting brick or tile. In this moulding method of building house walls, there is only the setting of the moulds and mixing and filling them with concrete, and this type of work can be done by unskilled labor, with one skilled foreman to direct the job. The advantages of this simple building process are quite apparent. As the moulds are in standard units, it is easy to utilize the piece-work basis, paying the workman a bonus on the moulds set and filled per day.

For the moulding of concrete houses there has been developed several different sized outfits of steel forms which are adaptable to different sized jobs. For the small job of one house in an isolated location, or for the small foundation job, there is a small No. 4 outfit. This is an outfit of only two moulds. It does not make the work rapid, as a drier mix must be used and the concrete must be thoroughly tamped in the moulds in order to make a dense wall, but has the advantage of requiring a minimum crew of 1, 2 or 3 men who can put up a wall. The cost of an outfit of this kind is $60 and the weight is 200 pounds, including the attachments to build corners. A small mixer can be used with this outfit, or the concrete can be mixed on a board by hand.

No. 3 outfit has been described. This was the type used on the Overlook Colony work. The No. 2 outfit is for still larger work and permits the pouring of a course around the entire house in one operation. No. 4 outfit allows an entire story to be set up and poured at one time.

Fault has been found with some of the earlier concrete houses because the exterior appearance was somewhat crude, as compared with houses of brick or wood. The development of the White Portland Cement Stucco has changed this, and the concrete house of today is made the best-looking house, as well as the most substantial.

The white cement stucco can be given a rough or smooth "texture finish." It bleaches out and becomes more charming with age. These white, stuccoed walls form a delightful background for vines and evergreens. The general effect of this stucco is white, as is shown by the exterior views, but the detail figure 6 shows the "tapestry texture" which was selected for this job.

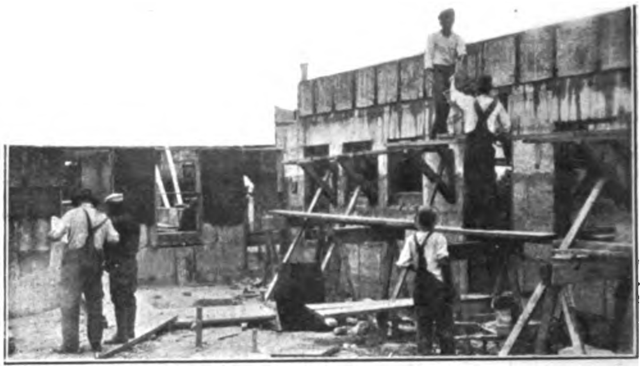


Fig. 4—Filling the Forms With Cinder Concrete

Cinder Concrete Walls Waterproofed With Portland Cement Stucco

The moulded concrete walls are made waterproof by the exterior stucco which keeps out all dampness. In the Northern States these moulded concrete walls should be insulated against the outside cold just the same as walls of brick or tile. This insulation can be gained by stripping the walls before the lath and plaster is applied, just as is the practice with brick houses, or porous insulating block can be moulded in the middle of the wall, in which case the inside finished plaster can be applied directly to the concrete walls.

Where stone or gravel concrete is used, wood blocks

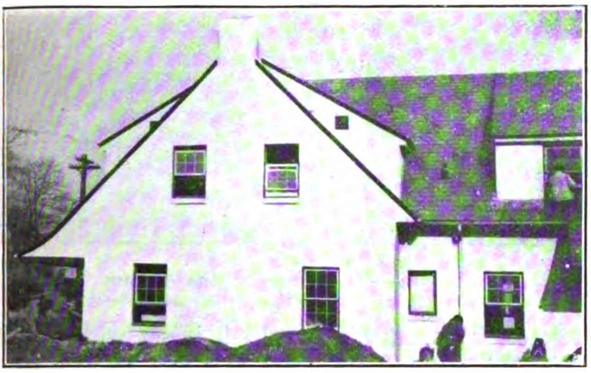


Fig. 5—End Gables Showing Attractive Finish of White Stuccoed Walls

are set in the concrete as the work is being done, to serve as a nailing for the interior finished woodwork. In the Overlook Colony houses and where cinder concrete is employed, these wood nailing blocks were unnecessary, as it was possible to drive nails directly into the cinder concrete much the same as into a wood block.

Moulding the Walls at Overlook

The door and window frames were placed in position as the work was done and the concrete moulded around these frames. This did away with all open joints and made a wind-tight, weather-proof house.

The detail figure 7 shows how the door frames were made and set in place. The reader will note that a sheet metal box was used to inclose the sash weight as shown by figure 9 and that this is a new idea in window frame construction. The frames were cut of standard size and came to the job knocked down. Figure 10 shows how the window sills were made weather-tight. The outside cement sill was moulded in place.

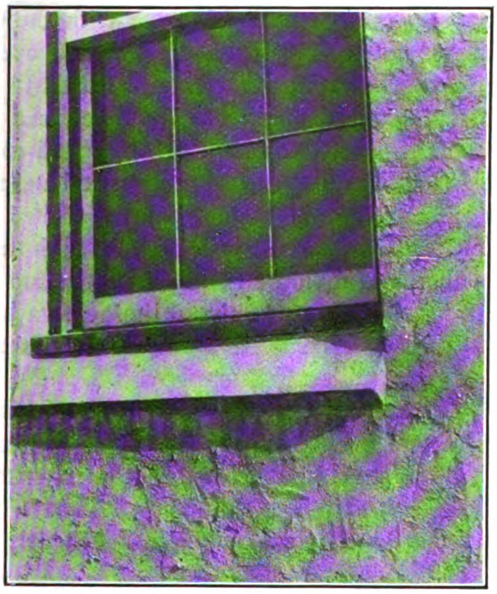


Fig. 6—Texture Finish—White Stucco

Advantages of Such Construction

Concrete is not always the cheapest material with which to build, but is the most permanent and least expensive in the long run. In many locations where sand and gravel are at hand or where cinders are obtainable, concrete has the added advantage of being the cheapest as well as the best construction to use.

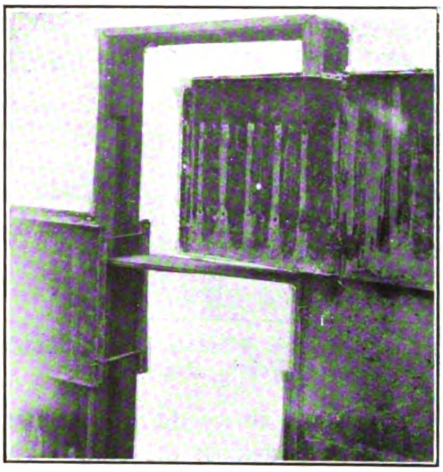
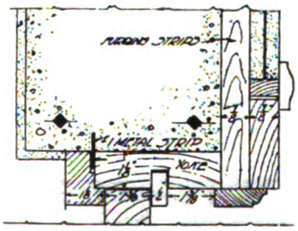


Fig. 7—Moulding Door Frame in Place

These moulded concrete walls presented a very attractive appearance. They were first roughly moulded, and then given one coat of Atlas White Portland Cement stucco. This stucco not only makes the walls waterproof and gives a permanent wall finish, but saves future expense of painting, upkeep and repair. The wall of a concrete house is different from the house of wood, tile or brick, because concrete becomes stronger with age.

Window Frames

Figure 8 shows a vertical section through the window head. A strip of tin is tacked to the yoke and extends up into the concrete. This makes a joint that is air-tight as well as water-tight. A section through the side of the window frame is also shown. The sash weight box is formed by tacking a channel-shaped metal strip to the pulley stile. The sill and the yoke are cut long, so that this metal weight box has a secure nailing top and bottom. On account of the channel shape of this metal box, it makes a very rigid frame and is at the same time lighter and less expensive than the usual wood frame. (See figure 9.)



SECTION THRO WINDOW HEAD IN 6" WALL
WINDOWS IN 8" WALL SIMILAR

The frames are made up with a reveal strip tacked on in place of the staff, as is shown in the detail. These temporary reveal strips build the frames out to the thickness of the walls, so that the frames when completed are set in the steel forms at any point desired, and the concrete poured around the frames, making a weather-tight joint. By the use of this simple metal weight box, the woodwork which is liable to shrink is reduced to a minimum when the concrete is poured around the windows. The temporary reveal strips are removed and the staff strip applied, which serves as a finish and forms the sash runway. The stucco is finished up against the staff. The reveal strips are made of 1¼ in. cypress, so that they may be used several times.

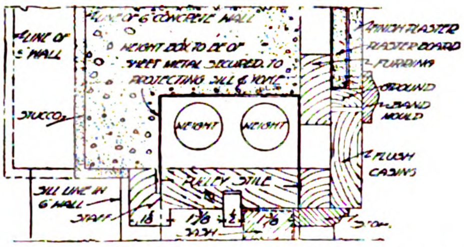


Fig. 9—Section Through Window Frame Showing Metal Weight Box

A sill detail is shown with a drip under the sash. The temporary reveal strips extend down below the wood sill and form a recess. The finished concrete sill is afterward molded in place. Wires are left projecting in the sill recess, which furnishes a secure bond. (See Figure 10.)

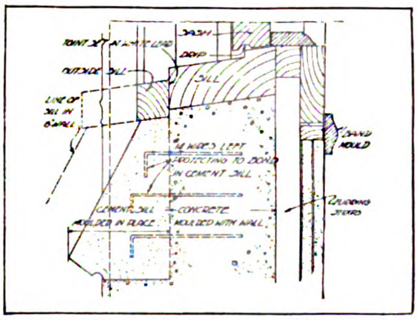

Joint set in white lead
Sash
Drip
Outside sill
Sill
Line of sill in 6" wall
Band mould
¼ wires left projecting to bond in cement sill
Furring strip
Cement sill moulded in place
Concrete moulded with wall

Fig. 10—Section Through Concrete Sill Moulded in Place

The outside wood sill is applied after the concrete sill is finished and so arranged as to extend down and over the joint between the main wood sill and the concrete. This outside wood sill is set with a white lead joint. While time is the best test of new structural details, such for instance as this window sill, it seems quite possible that it will eliminate one of the difficulties in concrete house-building—*the making of watertight window sills.* The brick in the usual wall are so porous that they absorb any water that beats in under the sill, but the concrete does not take the water so freely and this accounts perhaps for the fact that windows in some of our concrete houses have given trouble from leaks. As a rule the joints at the frames are more weatherproof in a concrete wall than in a brick wall.

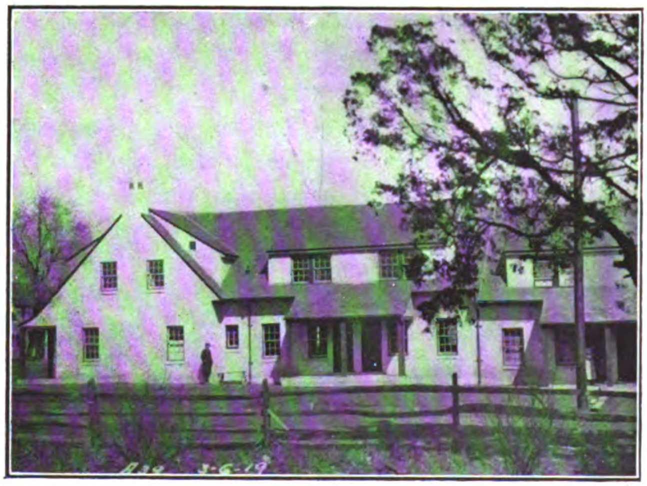


Fig. 11—The Five End Houses of the Row

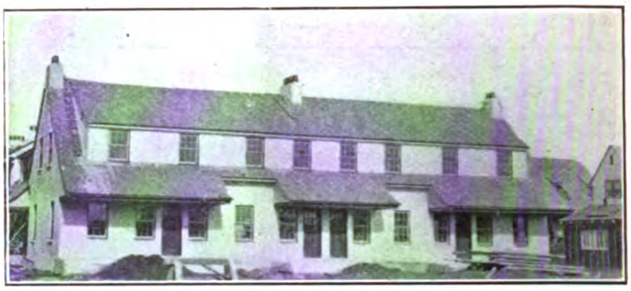


Fig. 12—The End of the Group

Flush Trim

All of the interior finish in these concrete houses is set flush with the plaster, instead of projecting, as is the usual custom. This reduces the woodwork to a minimum and the flush finish largely eliminates the dust catchers. The woodwork receives the first coat of stain before it is put in place. It was the original intention to eliminate all grounds as plasterboard was used, applying the same finish flush with the casing. The trim would without doubt be smeared over with plaster to some extent, but it was proposed to follow the plasterers up, cleaning off the trim, then applying a second coat of dark stain, which would cover up any stained parts, and finally to apply the band mould, much as picture mould is put up in a finished condition. The wood base is also put up flush with the plaster, and the band mould extends along the top of the base and mitering up and around the doorways. The usual projecting stool at the windows is omitted.

All exterior walls are furred with 1 x 2's, 16 in. on centers. Furring strips are secured by nailing into the cinder concrete walls. Architects as well as contractors have been slow to realize the advantage of concrete in house-building.

Concrete the Standard House Material

The most progressive men can see that concrete will become the standard in house-building just as it has already become the standard for foundations, pavements and factory buildings.

The entire village at Overlook Colony of 201 houses were designed by Mr. H. Errol Coffin, architect, 1123 Broadway, New York. The details of construction of the concrete houses, as well as the new method of moulding in steel forms, was done under my direction.

Proper Methods of Building Construction

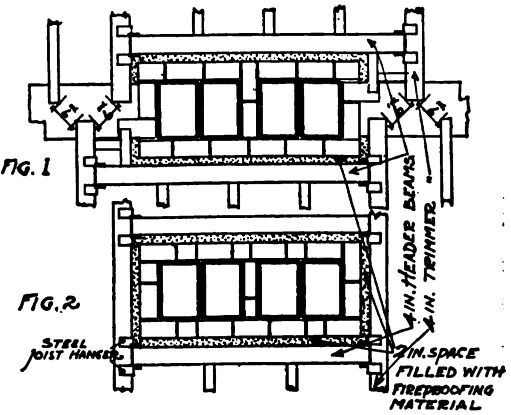
By Ira H. Woolson, Consulting Engineer, National Board of Fire Underwriters

IF you are planning to build a new home this year or to make extensive repairs in your old one, have you given any consideration to the question of making your house fire resistive? Have you thought of means for safe escape in case of fire at night when your family is asleep? Judging from past experience, the chances are at least seven out of ten that you have given very little thought to any of these matters, unless you have been compelled to comply with some building regulations. Usually such regulations are only partially effective for really safe construction, and most of the buildings in small towns and country districts lack even this safeguard. With dwelling houses in the United States burning at the rate of over 200,000 a year, it is as serious an oversight to omit fire prevention measures as it would be to omit the doors and windows. Many have learned this lesson by bitter experience. It is a strange fact that men will provide factories and offices with elaborate systems of exit and life-saving devices to protect employees from fire, and then will erect homes to harbor their own families without a single precaution for saving their lives in a similar emergency. The necessity for some action which will improve the character of dwelling house construction is very evident when we consider that there are tens of thousands of such buildings erected in suburban development and throughout the country entirely outside of any building construction control. When we realize that the fire loss on dwellings in this country amounted to $62,274,447 in 1917, to say nothing of the loss of life, it indicates the necessity for giving the problem serious consideration. Owners of dwellings do not know what proper fire-resistive construction is, nor the reason why certain methods of construction are safer than others.

A BAD PRACTICE

An Unlined Chimney of the Brick-on-Edge Type. The Roof is in Contact, and There are Cracks in the Chimney Underneath the Roof Similar to Those Above It. The Hazard is Obvious.

The surest way of getting a man voluntarily to build his home right is to convince him that it is his duty to do so to protect his family, and also to his interest as a financial proposition. This means education, and we should therefore make the necessity for removing hazards clear to him and indicate plainly the remedy.



PROPER METHODS

Fig. 1. Floor Framing Around Chimney in a Party Wall, to Secure Adequate Space Between Ends of Floor Joists.

Fig. 2. Ordinary Floor Framing Around a Chimney. All Timbers Two Inches Clear of Brickwork and Space Filled With Fire-Proofing Material.

Protection against fire is comparatively simple and inexpensive. It is merely a question of following certain construction principles which apply equally whether a building is small and cheap, or large and costly. A few of these fundamentals are here briefly indicated.

Materials

Other things being equal, a house is as burnable as the material of which it is built. The principal reason for America's great conflagrations is its great proportion of wooden buildings. If practicable, brick, stone, terra cotta, concrete or stucco should be used instead of wood. This cannot always be done, but the first question every one contemplating building a home should decide, is whether he cannot afford the somewhat larger expense of using fire resistive materials and thus gain the satisfaction of living in comparative safety from fire, particularly from exposure fires.

Chimneys

Passing on to special features, fire loss statistics show that the chimney is the danger point of a house.

A chimney should be solidly built, and be carried upon an independent, incombustible foundation; it should never rest upon wooden construction, because this will shrink and settle, causing the chimney to crack, and thus permitting the escape of sparks. It is a common practice in some parts of the country to suspend a chimney from a floor or roof timbers by iron hangers. It is dangerous, and should not be permitted.

A chimney wall should never be less than four inches thick, and should always be lined with chimney tile. This lining is very important; without it, the mortar between the bricks will eventually disintegrate and fall out under the action of the heat and the gases of combustion. For the same reason plaster is not a satisfactory chimney lining; it is sure to crack and fall off in course of time. Fire clay chimney tile manufactured for the purpose is the only safe material to employ, and its use will add very little to the cost of construction.

DANGEROUS CONSTRUCTION

Example of a One-Brick-Thick Unlined Chimney Resting Upon Wooden Supports in a Garret. This Chimney Caused a Fire. The White Spots are Flecks of Sunlight Shining Through the Partially Burned Roof.

The practice of building chimneys with bricks set on edge is particularly dangerous. It makes thin, unstable construction and the cracking of the mortar easily opens a hole between the bricks. It is imperative that the bricks be laid flatwise.

Woodwork should never be built into a chimney wall nor be permitted to touch a chimney; a separation of approximately two inches should be strictly required. This applies to all floor construction, partitions, rafters, roof boards, and shingles. Where a chimney passes through a floor, the space between the floor timbers and the chimney should be filled with some loose or porous incombustible material, such as cinders, refuse plaster or mortar, held in place by a sheet of metal nailed to the underside of the wooden beams. The space should not be filled with *solid* mortar or brick work, since this will transmit heat. Gypsum blocks, sawed to fit the space, constitute one of the best materials for this purpose. At the roof line, sheet metal protection set into the joints of the brickwork and overlapping the roof boards should be used.

There are two reasons for filling the space between the chimney and the woodwork:

1. It prevents a fire, originating on a lower floor, passing up behind a partition or furring surrounding the chimney into upper stories or the attic.

2. It avoids the possibility of rats or mice building nests in these spaces, thus filling them with highly combustible material, which in time may be ignited from heat transmitted through the chimney wall. Woodwork is frequently ignited in this way.

Next to the chimney comes the furnace, with its flue connections, as a source of danger. It operates twenty-four hours a day and may be left for hours without inspection. In cold weather it greatly increases the fire hazard, as is proved by the increased number of fires during cold weather.

Furnace danger usually is due to faulty installation. Furnaces are frequently set too close to wooden partitions or to the ceiling or floor construction above. Such exposed woodwork eventually becomes excessively dry, and needs but a spark to ignite it. On a cold night, when the furnace is given an extra charge of coal, it may become red hot in parts, and radiate enough heat to ignite nearby woodwork. Furthermore, the cellar where the furnace usually is located, generally becomes a store room for boxes, barrels, paper, excelsior and all kinds of highly combustible material. The record of cellar fires is high.

There should be a space of three feet between the furnace and surrounding woodwork, and at least a foot between it and woodwork above it. Even then, all such woodwork should be covered by loose fitting sheet metal, or some other incombustible material.

A half inch of plaster board, or asbestos board, is much better than metal for this purpose, as neither material will conduct the heat so readily as metal.

Where warm-air furnaces are used, the warm air pipes when attached to a floor register should have the space surrounding the register and the pipe filled with incombustible material, as in the case of chimneys. This is quite important, though generally neglected. If such spaces are not filled, a fire in the cellar will be quickly transmitted to the story above. Even though flame does not pass through the floor, the metal will become red hot and ignite anything combustible that may be near it, such as a carpet, rug, or piece of furniture.

In addition to protecting the registers, the warm air pipes leading from the furnace should be protected by a half-inch layer of corrugated asbestos paper. It costs but little to do this, and if a fire should occur in the cellar, the covering will prevent its passage to the stories above. Unprotected pipes will quickly become red hot and air passing through them will be superheated and distributed to the rooms above, where it will ignite everything combustible it touches. Furthermore, floor registers are liable to collect lint and dust, which would be ignited and throw a blast of fire into a room. It is important that warm air pipes in cellar or basement be very securely supported by extra heavy wire, or strips of sheet metal. The light weight wire ordinarily used for this purpose will soften and lose its strength when attacked by fire, thus allowing the pipes to fall and so produce open flues which would distribute a fire throughout the building.

Where hot-water or steam-heating systems are used, the pipes should be separated at least one inch from the woodwork. Contrary to general belief, it is possible for fires to originate from this cause, even in low-pressure systems. There are many such cases on record.

Exits

It is a fundamental principle of safety to life that at least two exits shall be provided from every story of every building. This is generally recognized in commercial buildings, but is just as applicable to the home. If there is but a single stairway and it is serving as a chimney for a fire, it instantly becomes impassable, and the only escape is by jumping from the windows. Do you realize that a jump from a second story window almost invariably results in broken limbs, and often in death?

In planning a house with a back stairway, it is important to avoid having the front and back stairways meet on the same landing, as is often done. In that case, the second stairway has no advantage as a separate means of exit. The two stairways should always be entirely independent of each other.

The stairway leading from the first floor to the cellar should always be enclosed, and have a door at the bottom of the stairway. This enclosure should be of such fire-resistive material as metal lath and plaster, or if the house is of a character to warrant it, should be enclosed with brick, terra cotta or gypsum blocks. Such an arrangement will prevent a fire in the cellar from passing quickly to the floor above.

Doorways that open from the first floor into the kitchen and laundry should be of fire-resistive material, or, at least, they should be solid wooden doors, without thin panels, so that a fire occurring in the kitchen will not spread to the rest of the house easily. Such doors should also be equipped with a self-closing device so that they will never remain open.

Fire should be shut off in the cellar first, and next in the kitchen and laundry. These are the places of likeliest origin.

Roofing

Wherever the additional cost is permissible, always cover your house with incombustible roofing, of which there are many types, such as asbestos shingles, slate, composition shingles, tin roofing, tiling, etc. Old wooden shingle roofs are always dangerous. Even with isolated houses, sparks from the chimney, lodging in the rough curled up edges of old shingles, have caused innumerable fires.

Any treatment of shingles which prevents curling of the edges reduces the fire hazard by keeping the roof surface smooth and preventing lodgment of sparks. The use of creosoted shingles, or shingles dipped in fireproof paint, or even linseed oil, will add to safety and the life of the roof.

Many a house could have been saved from complete destruction if, when it was built, some attention had been given to fire-stopping the open spaces in partitions, walls and other points of communication between the various stories. Every floor should form a complete cut-off, so that a fire cannot reach the story above without actually burning through the floor; this takes a reasonable time and gives a chance for fire fighting.

The owner should pay particular attention to this part of home construction. It is far more important to him than the balustrade around his front stairway, or the decorations on the front porch; it simply calls for conscientious attention to details while the building is under construction. Ordinarily, such stopping is effected by nailing in pieces of refuse wood; often it is a boy's job, and not supposed to require any special skill. On the contrary, it should never be delegated to any but a careful workman. Such fire-stopping should be of incombustible material similar to that called for around chimneys; it should extend from the bottom of the floor beams to a few inches above the floor level. Even if wood be used for this purpose, it is strongly urged that loose incombustible material be placed on top of the wood. It fills up cracks due to careless workmanship or shrinkage.

Never permit any open, concealed spaces behind woodwork which are not fire-stopped.

Fire-stopping should also be provided at the line of the eaves to prevent a fire from a nearby burning building getting into the attic, where it is difficult to combat. Such fire-stopping will also protect against a fire lapping up under the eaves from windows below. Heat always banks up under the eaves and unless precautions are taken it is sure to find some crack through which to enter the attic.

These are some of the more fundamental requirements in home construction; there are many other desirable precautions, but it is safe to say that if all dwellings yet to be built in the present year were to follow the instructions here presented, many lives and much property would be saved.

Oppose Repeal of Anti-Wood Shingle Ordinance

OPPOSING the suggested repeal of the anti-wood shingle ordinance in force at Greenville, S. C., Manager Holliday of the South Carolina Inspection and Rating Bureau, urges local insurance men to do all in their power to prevent such action. In part Mr. Holliday says "that while anti-wood shingle measures do not usually prove immediately effective in reducing the fire hazard the gradual elimination of inflammable roofs will certainly help toward that end. A start in the right direction should be pressed unceasingly."

Life of a Steel Building

ARCHITECTS, engineers and others associated with building construction will be interested in the following extract from the "Investors Magazine" regarding the life of a steel structure, concerning which there has been no little discussion during the past few years:

What is the life of a steel frame building? When these structures were first erected, a little more than a quarter of a century ago, many predicted that the steel would rust, and within ten or fifteen years the condition of the structure would become dangerous. But there now are standing a number of buildings more than twenty-five years old, constructed on the steel-frame principle, with the weight supported by the skeleton and the walls merely a shell. These buildings are in good condition, practically as solid and substantial as when they were built. But recently the razing of the old Champlain building on the northwest corner of State and Madison streets, Chicago, gave the opportunity to examine the condition of the framework and allow experts to draw the deduction that a properly constructed steel frame building will last for hundreds of years.

* * *

The Champlain building was constructed in 1893 on a lot 66 x 106 feet. The building was fifteen stories in height, with one shallow basement. It had structural steel framework with joists five feet apart, flat tile arches and fireproofing of terra cotta brick and terra cotta curtain walls, and a so-called floating foundation—shallow spread footings on blue clay. The steel frame was painted with iron oxide paint, two coats.

When the building was torn down, after standing for nearly a quarter of a century, it was found that the steel was practically unaffected by rust, the greatest corrosion visible, under the microscope, being .009 of an inch. Practically speaking, the steel was in as sound condition as when it was first put in place, and all signs indicated that the building was good for an indefinite period. The footings, steel I-beams—unpainted—embedded in Portland cement, showed no corrosion whatever.

* * *

Holabird & Roche, the architects of the building, who conducted the examination when it was torn down, came to the following conclusions as a result of their investigation:

"The condition of this building seems to indicate that the exclusion of air and moisture is essential for the preservation of the steel and also of the paint. The appearance of the rust suggests that it may have been formed soon after the building was constructed and that it has not been progressive. Even if the worst case of rusting has been progressive and should continue at the same rate, it would be more than a century before failure of the member would result.

"The present practice of encasing all structural steel in concrete, or plastering it with Portland cement mortar; separating the pipe shaft from the steel; and of using greater care in covering terra cotta anchors, certainly safeguards the framework of the structure for a much longer period than the probable economic life of such buildings."

Building to Be of Reinforced Concrete

OVER $750,000 will be spent by the Nashua Manufacturing Co., of Nashua, N. H., for the erection of a new mill at their Jackson Mills plant at Nashua. Plans for the new structure have been prepared by Lockwood, Greene & Co., of Boston and the contract let by them to the Aberthaw Construction Co., of the same city. The new building will be of reinforced concrete, with wood covered floors. It will occupy a ground area of 560 feet x 122 feet and consists of a central section seven stories in height and two end sections of three and five stories respectively, provision being made for two stories to be added to each at some future date. A feature of the mill is the location of the picker room on the top floor of the central section and the employment of gravity conveyors for the distribution of the raw and manufactured product to the various departments. The erection of the building involves the diversion of the present canal system, which will form the basement of the new structure, and the demolition of the present office building, cloth room and two storage warehouses. Work is to commence immediately.

Shingle Roofs at Salt Lake City

WOOD shingle roofs, according to the lately-issued annual report of Fire Chief W. H. Bywater, were responsible for fifty-one fires in Salt Lake City, Utah, last year, or seventeen per cent. of the total fires for the period. Because of this Chief Bywater recommends the enactment of a municipal ordinance prohibiting the use of wooden shingles as roof covering within the city limits.

Chelsea, Mass.; Augusta, Atlanta, Nashville, Paris, Texas, and a long list of other cities all suffered disastrously because of the fire-breeding shingle roof, and if Chief Bywater needed arguments other than those supplied from his experience at home it could be secured from the authorities of the communities named.

It is expected that the fine new building in process of erection at Peoria, Ill., for the Peoria Life Insurance Company will be ready for occupancy by February 1, 1920. The structure will be 100 x 171 feet and sixteen stories in height. With a steel frame, its walls will be of concrete and stone, faced with terra cotta. Its owners assert when finished the building will be unsurpassed by any of its type in Illinois.

Supply Dealer an Important Factor in Building World

THAT the supply dealer is an important factor in the building world, and that if advantage were taken of the opportunity for service presented him he would become increasingly so, was the statement made by Virgil G. Marani, chief engineer of the Gypsum Industries Association, in a recent address before the Indiana Builders' Supply Association, in convention at Liberty, Ind.

In part Mr. Marani said:

"The demands of modern building and the adaptation of types of construction for specific purposes has extended to the scientific consideration of building materials, and the field of possibilities for the materials expert is practically boundless.

"Illustrating this fact we find the tendency to specialize in fireproofing construction and materials, and many of the technical schools of today are providing courses along this specialized feature of construction with a full sense of realization that a thorough knowledge of fireproof materials and the proper placing of such in construction will be but another step in advance towards the reduction of the nation's excessive annual fire waste.

"The building supply dealer is a very important intermediary faction in the safe and sane building program of the nation. By reason of his very necessary knowledge of all materials entering into every possible class of building he is forced to become an expert on the use of every unit which is needed to make any completed structure a permanent monument to his honor and integrity. It is the building supply dealer who supplies the needs of an intelligent specification or a sane and just building ordinance. The terms 'intelligent' and 'sane and just' are here used because in many cases specifications are not 'intelligent' and many building laws are anything but 'sane or just.'

"The building supply dealer of today may justly be considered the material diagnostician. The architect is the specialist who prescribes. In many cases his prescription cannot be confined to any one of many materials equally suited for the purpose desired, so that after all the choice of suitable materials for specific purposes is often based upon the advice and judgment of the supply dealer who in turn is prosperous in proportion to his honesty and thorough understanding of the materials he handles and recommends.

Fire Waste

"This nation's annual fire waste is a matter of history and illustrates the inconsistency of our methods when we are willing to spend millions to extinguish fires but grudge a very slight increase in the cost of construction which would make possible types of buildings which are less susceptible to destruction by ordinary fire hazards.

"Illustrating, the following information is based upon the records of the National Fire Protection Association:

Annual fire loss in the United States..	$250,000,000.00
For every man, woman and child....	2.50
Cost of Fire Insurance, Fire Departments, etc., per capita............	2.50
Total cost per year for every man, woman and child	5.00
Average cost of above per year for France, Germany, Switzerland, Italy, Austria and Denmark	.33
Loss per capita for Italy, as low as....	.12
Loss per capita for Germany, not over	.49
Loss per capita in United States, as high as	2.72

"The loss by fire in the United States each year is about one-half of the cost of all the new construction for that year. This is not entirely due to the prevalent use of wood in construction. The rapid development of our cities, the somewhat temporary nature of many buildings, the migratory tendencies of many people, and other necessary economies are all factors that in the end make the use of lumber for building purposes not only desirable but often advisable. By proper precautions and the wise use of incombustible protective materials, constructions of wood can be made reasonably fire-resisting.

Need for Safe and Sane Building Code

"From what has been stated, it is perfectly evident that safe and sane building regulations, which are consistent, and which favor no particular material or special type of construction, if properly enforced will do much to encourage healthy competition and better building.

"There is sufficient information at hand, from existing codes, and the inadequacy of most of them, to enable a diagnosis about as follows:

"(1) The writers of Building Codes are in many cases not informed upon the construction and use of many materials for which they frame governing laws.

"(2) Often (only too often) Commissioners appointed to frame building laws are politically appointed, politically controlled, and naturally under the influence of many inexplicable political ramifications.

"(3) 'Appeal Boards' are usually under the same disadvantages though they should also be entirely out of politics and should be appointed from a list of names submitted by the local organizations representing the Architectural, Engineering, Builders and Real Estate interests of the community.

"(4) Building Codes are too voluminous, they should cover only such requirements as are the 'minimum' possible for safety and health. A small code all enforced, alike to everyone, is better than a voluminous code from 25 to 50 per cent. enforced.

"(5) In the allowable use of materials for all types of construction and for 'fireproofing,' such materials should be placed on a merit basis, *i. e.,* should be required to conform to certain specified strength and fire-resistive requirements.

"If materials are mentioned by name (as is usually done), the 'maximum' kind and nature of materials which can be used should be allowed, instead of mentioning a few favored products, and admitting others or not, as the case may be, under the vague, uncertain, and much used term '*or other approved* materials and construction.'

"(6) Contrary to present tendencies, the more general construction of fireproof buildings should be encouraged by admitting the greater use of many types of construction and materials, which now are allowed in many codes under certain penalties and restrictions. In many portions of 'fireproof' buildings *incombustible* materials serve the purpose as well as so-called *fireproof* materials, and are cheaper.

"(7) Since 99 per cent. of the buildings built per year in the states are not fireproof, building codes should give more attention to the proper construction of this type of structure. At present practically 75 per cent. of any code governs the construction and materials entering into *fireproof construction.*

"(8) Buildings should be classified according to the degree of protection of their construction against the action of fire, which might be somewhat as follows:

> "Full protection signifying what we know as fireproof.
>
> "Partial protection signifying what we know as semi-fireproof.
>
> "Temporary protection signifying what we know as slow burning, and applying particularly to the frame structure properly designed and protected.

National Organizations of Service

"There is no reason for unnecessary delay or expense in the writing of building codes because practically all the information needed regarding the use and strength of materials can be obtained from any of the national organizations interested in these lines of activity. The organizations referred to which furnish information of this character free of cost are the following:

American Society for Testing Materials
United States Bureau of Standards
National Board of Fire Underwriters
Underwriters' Laboratories
American Institute of Architects
American Society of Civil Engineers
American Society of Mechanical Engineers

and many of the leading technical institutions throughout the country.

"Illustrating the importance of building supply dealers engaging in interested activity in the enactment of proper building regulations, and the correction of such regulations as are not up-to-date, throughout the entire country, manufacturers have formed into associations whose prime object is the furtherance of knowledge regarding their materials and the adoption, by building codes and similar laws, of standards which will conform to the manufacturers' desires and make possible the economical production of materials and their proper use in various types of construction.

Nature and Uses of Gypsum Products

"It is on the nature of this type of activity that I am addressing you tonight on behalf of the Gypsum Industries Association, who, as a body, represent not less than 80 per cent. of the tonnage of all gypsum products placed in the market."

Note: At this point of the address Mr. Marani went into a thorough explanation of the following:

Kind and number of gypsum products.

Plaster and plaster troubles. The cure.

What gypsum is and how it acts.

Work of the Gypsum Industries Association during the war and what it did for the government.

Result of co-operating of manufacturers in competition and co-ordination tendencies of all industries.

Work proposed by the Gypsum Industries Association for the future.

"In closing, I firmly believe that the future holds wonderful opportunities for the building supply dealer and that in the not far distant future he will become as important a factor in the building industry as the architect or engineer; in fact, I believe he is as important at the present time. With this in mind I urge upon those present to take an active interest in all forms of legislation affecting the products they handle, and I can assure that in all such cases the Gypsum Industries Association will gladly co-operate and assist when such co-operation or assistance is desired."

Private Garage Hazard

A dangerous condition has arisen in the past few years in the ever-increasing number of garages being built in buildings used for dwelling purposes, warns the National Board of Fire Underwriters. These private garages are not subject to strict inspection and regulation, as are public garages, and are frequently maintained in a careless manner, with gasoline and oils scattered on the floors, and kept in unsafe receptacles. No automobile should be permitted to be stored or kept in any building, regardless of construction, in which three or more families live, unless the room or part of the building in which one or more automobiles are stored be entirely of fireproof construction and to which there be but one entrance, and that by the street.

Building Boom About Due

FROM reports made by engineers of the Lime Association who have been interviewing architects in the leading cities of the country regarding building prospects, Robert F. Hall, general manager of the Association, is convinced that "a tremendous building boom is about to begin."

The optimism of Mr. Hall is shared generally by intelligent observers of economic conditions. The country is underbuilt. The virtual cessation of operations during the period of the war having created a serious shortage of all types of structures, to supply which will require at least five years of unusual activity; if, indeed, the pressing demand can be supplied within that period. Further, the increased wealth of the farmers has aroused a desire on the part of many to replace their present homes with more modern and attractive buildings, for the erection of which they are prepared to spend money freely.

It is now accepted as a truism that there will be no substantial reduction in either labor or building material for a considerable time at least, and the strong probabilities are that the costs of a number of essential building products will be advanced from present figures.

For the above, among other reasons, the optimism of Mr. Hall would appear to be well founded.

Poor Pipe Covering a Fire Menace

NOW and then the Minnesota State Fire Marshal's office receives a report of a fire originating from defective pipe covering. On investigation we have found that the pipe covering causing the trouble consisted chiefly of several layers of felt paper with a very thin asbestos lining and an outside covering of cheesecloth.

The object of covering pipes in this manner is to save heat and fuel and the idea is a good one and it has the approval of this office, providing the proper kind of pipe covering is used, made of material that will not catch fire. However, in using the material described above an additional fire hazard is placed in the home or building in which it is used. Pipe covering to be safe should be made entirely of fire-resisting material. It costs more, of course, but the object of using pipe covering is to save heat. Economy is the reason and it is not economy to cover pipes to save fuel with a material that may set fire to your building.

In one case reported, the pipe covering caught fire and the smoldering pieces dropped off falling into a barrel of rubbish, which happened to be standing underneath the pipes, setting fire to the same, which in turn, communicated with a wooden partition. It happened that the fire was discovered by the occupants of the home and it was extinguished before it had gained much headway, resulting only in a small loss. Had it started at some time when everyone was away from home, this defective pipe covering, together with the barrel of rubbish, might have resulted in the total destruction of the home.

Inspect your pipe covering to see if this fire hazard exists in your building. If it does, it should be removed at once. If you are building and planning on using any pipe covering, make sure it is of fire-resisting material and not the kind that will endanger life and property.

Building Activity in Principal Cities of New York

REPORTS on building work authorized in cities of New York during April are very encouraging. The total estimated expenditures for this work amount to $19,422,765. This is 58 per cent. greater than the estimate for March, 127 per cent. greater than the estimate for April, 1918, and 39 per cent. greater than the estimate for April, 1917. It should be noted that April is the first month of 1919 in which building work authorized exceeded the figure for the same month of 1917. This is due partly to the fact that building work was declining at this time in 1917, and partly to the fact that the revival of building in 1919 is gaining momentum.

Rochester shows the greatest increase in building over April of last year by any of the cities of the state—the 1919 estimate is 162 per cent. above the 1918 figure. New York City comes next with an increase of 153 per cent., all boroughs showing an increase over 1918 and also over March of this year.

Troy shows a decrease of 46 per cent. in authorized building work from the March estimate, and a decrease of 16 per cent. from the April, 1918, figure. For Yonkers, April building is greater by 23 per cent. than in March, but is 66 per cent. lower than in April, 1918.

Lessons of the Mobile Fire

ONE of the worst fires in the history of Mobile, Ala., occurred on the 27th inst., when 240 houses in the older residential section of the city, were totally destroyed, entailing a property loss in excess of $4,000,000. That the business district was not burned as well was due to a fortunate shift in the wind, and to the effective aid given the fire-fighters by employees of shipbuilding plants upon the waterfront.

As a result of the fire a strong agitation is under way for the adoption of a more stringent building code, and especially for an ordinance that will prohibit absolutely the further use of the dangerous wood shingle.

John H. Sheier, architect of New York City, has been commissioned to design a $300,000 theatre at New Brunswick, N. J. The building is to have a seating capacity of 2,500 people. In its planning Mr. Sheier is "adopting all the best features of the New York and New Jersey building codes, in order to produce a thoroughly up-to-date theatre."

Barrett Specification Roof on Round House of Southern Railway System at Finley Yard, Birmingham, Ala.

Meeting the severe conditions of railroad service—

THE giant round-house pictured above with stalls for twenty-five locomotives, and all the other buildings of the Southern Railway System shown on this page, are covered with Barrett Specification Roofs.

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This guaranty is in the form of a 20-year Surety Bond issued by the U. S. Fidelity & Guaranty Company of Baltimore and is furnished without charge.

We offer this bond on all Barrett Specification Roofs of 50 squares and over in all towns of 25,000 population and more **and in smaller places where our Inspection Service is available.** Our only requirements are that the roofing contractor shall be approved by us and that The Barrett Specification dated May 1, 1916, shall be strictly followed.

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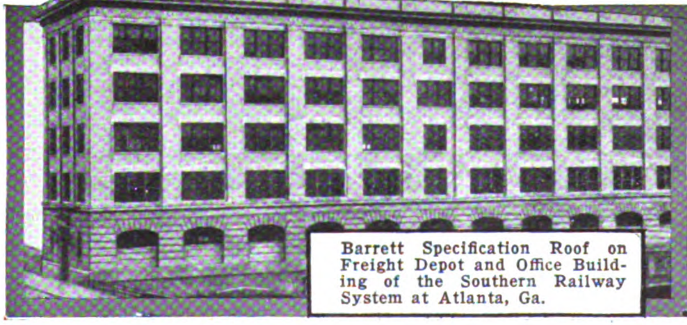
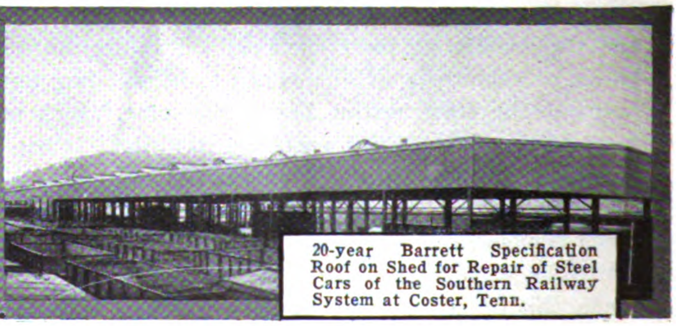

Barrett Specification Roof on Freight Depot and Office Building of the Southern Railway System at Atlanta, Ga.


20-year Barrett Specification Roof on Shed for Repair of Steel Cars of the Southern Railway System at Coster, Tenn.

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The Fireproofing News

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LATEST EDITION

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Priceless

Cement Companies Seeking Export Business

A systematic drive for foreign business will be made by a combination of prominent eastern cement manufacturers, ten of whom, with an annual output of 14,000,000 barrels, have formed the Cement Export Company, Inc., a Delaware incorporation. The chief offices of the new organization will be in New York City.

Present directors of the enterprise include: Emil Loeb, Coplay Cement Manufacturing Company; Joseph Brobston, Dexter Portland Cement Company; J. A. Horner, Nazareth Cement Company; L. C. Morton, Phoenix Cement Company; George F. Bayle, Glens Falls Portland Cement Company; J. W. Fuller, Allentown Portland Cement Company; Frank H. Smith, Lawrence Cement Company; Charles F. Conn, Giant Portland Cement Company; Morris Kind, Hercules Cement Corporation, and F. W. Kelly, Helderburg Cement Company.

The principal office of the company will be in New York. Arrangements are under negotiation with the Bureau of Standards to test all cement delivered by the company and to certify that the cement fulfils all requirements of the standard specifications of the American Society for Testing Materials.

The plan provides that companies now exporting under their own label may continue to do so if desired. All cement delivered by the export company, however, will be shipped under the label of the export company.

As Portland cement for domestic shipments is almost entirely delivered in paper or cotton sacks and as most export shipments are called for in wooden barrels the matter of cooperage is of great importance. Tentative plans have been outlined for the erection of a barrel manufacturing plant at tidewater, with a large storage warehouse equipped with barrel packing machinery in connection therewith.

By having a large stock of cement in storage at tidewater at all times it is believed better advantage can be taken of the somewhat limited shipping facilities now existing to South American countries. While it is the expectation of the Cement Export Company that its activities will be confined largely to Latin American countries it will be in a position to send cement to Europe if conditions make this desirable.

Consideration has been given to the construction of concrete ships of large capacity to take care of the growing demands for Portland cement of American manufacturers.

Under the terms of a new law the employment of women under twenty-one years of age as elevator conductors is prohibited in New York State. The statute further provides that the working hours for such employees shall not exceed fifty-four hours a week, and that seats for the women conductors must be provided in all elevators.

A branch office at Philadelphia has recently been opened by the Aberthaw Construction Company, of Boston, under the management of E. V. Schafer, formerly assistant mechanical engineer at the League Island Naval Air Craft factory.

To meet the growing demand for its products in Texas the Barrett Company, of New York City, has established a branch at Dallas under the management of V. M. Duke.

Metal lath continues to gain in favor in all classes of building construction as the merits of the product become better known.

L. L. Kober, of the Lime Association, is visiting architects in and about Cleveland, Ohio, in the interest of lime plaster.

Favor a Standard Building Code

At the annual convention of the National Fire Prevention Association, held at Ottawa, Can., on May 5th-8th, both dates inclusive, a series of resolutions looking to a reduction in the annual fire waste both of Canada and the United States, was adopted.

Prominent among the recommendations were the following:

"The adoption by municipalities of a Standard Building Code, to the end that fire-resistive building construction may be encouraged, the use of inflammable roof coverings prohibited, adequate exit facilities from buildings assured, and interiors so designed and fire-stopped as to make easy the extinguishment of fires therein.

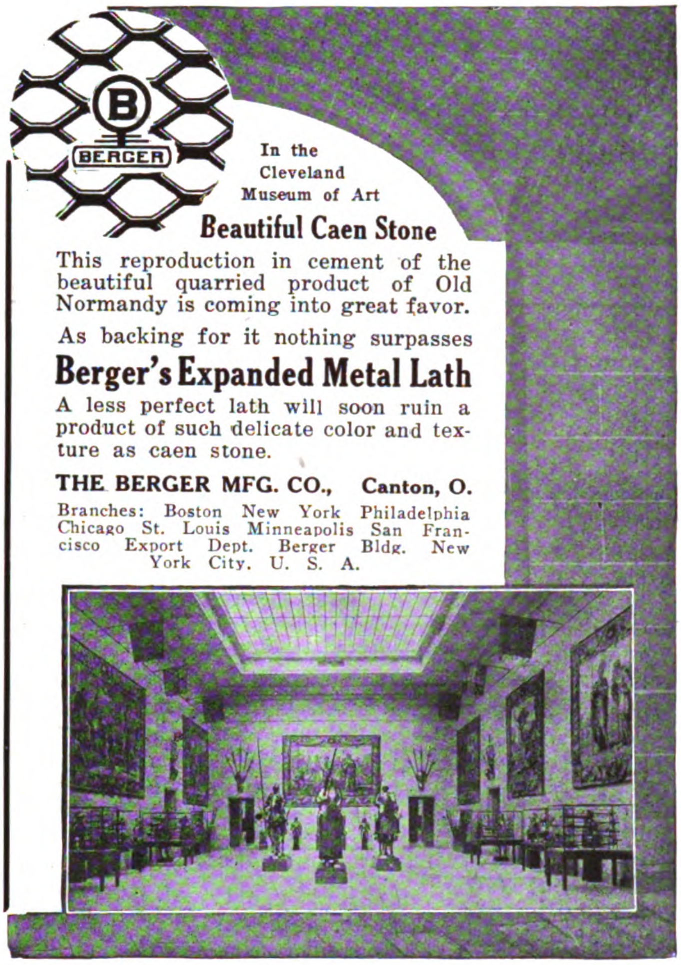
"The wider general use of the automatic sprinkler as a fire extinguishing agent and life saver, and the more general adoption of the fire diversion wall as an important life-saving exit facility."

If these two important measures were generally accepted by municipalities and their provisions honestly and intelligently carried out, there would soon be a marked reduction in the number and seriousness of fires, and a pronounced saving in the values now going up in smoke each year.

Readers of CONSTRUCTION are in a position to peculiarly aid in bringing about the conditions desired by the National Fire Protection Association, and should actively interest themselves in the effort.

A Good Building Law

Montezuma, Ga., has a city ordinance which prevents the erection of any wall of inflammable material adjoining any other building built of brick or concrete. The adjoining wall must be of eight-inch brick or concrete construction. This measure is designed to safeguard owners who go to the expense of erecting a fire-resisting building, with a comparatively low fire insurance rate, from being forced to pay a higher rate because of the acts of their less public-spirited neighbors.



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Million Dollar Plant for New Haven

The Seamless Rubber Company, of New Haven, Conn., manufacturers of rubber goods, has placed a contract with the Aberthaw Construction Company of Boston, Mass., involving an outlay of over $1,000,000 for the construction of a new plant near its present location. The contract is the result of an industrial investigation and recommendations made by the Aberthaw Company and while plans are not yet completed, it is known that the new plant will contain about 300,000 square feet of floor space, as compared with the 167,000 square feet available at present, and will embody the most modern elements of design and arrangement as regards routing of work.

Information from various sources plainly indicates that the stagnation in building activity is about at an end. Evidence of this is seen in the contract for a new picker building at a cost of approximately $100,000, for the Butler Mills of New Bedford, Mass., and an industrial housing project at New Britain, Conn., for the Stanley Works, both of which were placed with the Aberthaw Construction Company and call for the immediate commencement of work.

The New Britain housing project will represent an outlay of about $170,000 and calls for the construction of a number of single and double houses, all of wood construction with stucco finish. The single houses will be of six rooms each; the double houses contain two apartments of five rooms each. Hot-air heat and electric lights will be supplied each house.

The picker building for the Butler Mills will be of re-inforced concrete with brick facings, three stories, 101 by 115 feet and will have the bale breaker or opening room on the top floor, picker room on the second floor and the duster on the ground level.

Another textile development, on which work is already under way, is the construction of an entirely new, complete mill for the Jackson Mills at Nashua, N. H. This contract, with the others to which reference has been made, represents a total of nearly two and a quarter million dollars of construction in New England now under way by the Aberthaw Construction Company.

To maintain efficiency among employees of industrial plants, the free circulation of pure air is absolutely essential. Through no better medium can proper air be secured than by the use of "Star" ventilators, manufactured by the Merchant and Evans Company, of Philadelphia. A booklet illustrating and describing its ventilators has been issued by the company, a copy of which may be had upon application by anyone—architect, contractor or prospective plant builder.

Brick Favored at Cleveland

There is significance in the building record of Cleveland, O., for 1918, says the American Clay Magazine. In that year eight and a half million dollars was spent for frame residences and a half million for brick dwellings. On the other hand, nearly three millions were spent for brick apartments and only a quarter of a million for frame apartments. It's an interesting problem to figure out why a brick apartment seems to be so essential and where a single dwelling is built the owner seems to put himself in the hands of old Mr. Fate and General Decay by building of frame.

Wooden Shingle Ordinance at Indianapolis

Members of the Indianapolis City Council and representatives from the fire department, city salvage corps and state fire marshal's office viewed some tests of the fire-resistive properties of wooden shingles and other forms of roof coverings at one of the principal lumber yards of the city recently, says the National Underwriter. There is an anti-wooden shingle roof ordinance under consideration by the City Council and the usual influences are at work to defeat or modify it. It was brought out in the course of the tests at the lumber yard that shingle roof fires averaged from fifteen to twenty a day during several months last winter and also that the most of these fires occurred in the older parts of the city where most of the shingle roofs are old. Those who are after really practical results from the proposed ordinance are resisting its modification to the use of wooden shingles if they are dipped or painted. While this treatment may improve the fire-resistive quality of the shingle this quality deteriorates so that within a couple of years such shingles are not much better than the untreated kind.

Public Schools Made Safe

Under the North Carolina law no school houses may be erected until after the insurance commissioner has passed upon the plans, as regards their fire-resisting construction and the safety of egress in case of fire. Commissioner Young says that fire-proof buildings will not be mandatory, but the designs and material must conform to standards of safety which experience has proven most efficient where inflammable material is used. He is particularly concerned with the erection of standard flues as it is from this item that most fires get their start in school buildings.

At an estimated aggregate cost of $17,950,206 the Board of Education of New York City plans the erection of twenty new school buildings in the near future.

Favors Fabricated Houses

In the opinion of Allen E. Beals, a partial solution of the housing problem in New York City would be the erection of fabricated houses, a number of which are now being erected in the Borough of Bronx.

Describing the fabricated house, Mr. Beals said in part:

"It is built on the plan of Henry Ford's Eagle boats during the war. Each house is divided into sectors twelve by four feet. They can be made 500 feet long or 25 feet long, 50 feet deep or 500 feet deep, except the probable limitation of two stories and an attic. Six architectural layouts can be made from the segments, which can be turned out in the ordinary lumber mill."

Mr. Beals said that one of the new houses had been erected by the George F. Gates Company at the foot of East 152d street, where any one might inspect it.

Simplicity in Roof Construction

All over the world there is an evident disposition to regard the roof as a building problem of increasing seriousness. It is not now a matter of wooden shingles or any other old roof, but what roof is best and cheapest in the long run. The ablest engineering and architectural minds in the world are considering the roofing problem as never before, and the outcome is bound to be simplicity and serviceability.

As one of the results of war experiences, as outlined by a writer in the Building World of London, Eng., the domestic roof is coming into its own for careful consideration. It can scarcely be denied, he says, that in the past far too much money has been spent in the wrong way on roofs. The houses of the future in England, in town and country, will be of the semi-detached type for the most part. With municipalities forbidding more than six or eight houses to be placed together, or to be of the same design, the terrace house goes out at one blow, and he adds:

"In the past the semi-detached house has had too much attention paid to its roof with a view of getting a showy attractive skyline, but today considerations of economy will rule out all unnecessary features. Even the popular red tile may have to make way for some cheaper and lighter covering for the same reasons. In this respect there are many good roofing materials to assist a lighter form of construction by reason of their absence of weight. Some of them have good wearing qualities, and might find favor before the much-hated corrugated iron, which in towns has but a short life.

"With the carelessly free motor vehicle emitting sparks along every country road, even the picturesque thatch has gone out of favor, and despairing of finding anything endurable that is so light and cheap, the corrugated iron sheet has come into its own in the wrong place. There is now a good chance of makers of light roofing materials booming their manufactures with benefit both to themselves and the country-side generally. It is safe to say that if only property owners knew of something good to take its place they would never replace a worn thatch in these days, for not only is it far from satisfactory in itself, and also a danger to those under it, but it is very destructive of the timbers that bear it.

"In America there is a far greater choice of roofing materials than there is here—some good and others indifferent, with a few too openly bad to find acceptance in England. There might be, however, a much greater variety if only manufacturers will get down to the subject and grapple with it, and now is the time. Sloping roofs are not likely to be ousted yet by the flat one, and until they are, there will always be room for new reliable roof coverings.

"With a light, enduring, and easily handled roofing material great economies might be effected in roof timbers, and this, at the present time, is a matter of considerable importance. If we only had a few of the lighter coverings that they have in North America, some of the less substantial roof timbers, of which there are millions of standards waiting to be shipped across the Atlantic, could be used. Many American sizes of these are based on the use of the lighter roofing materials to be obtained there, and most of these are very cheap and fairly long-lived in use.

(To be concluded next month)

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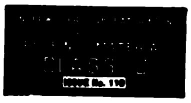

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Ralph P. Stoddard, Associate Editor
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Volume Eight **Number Six**

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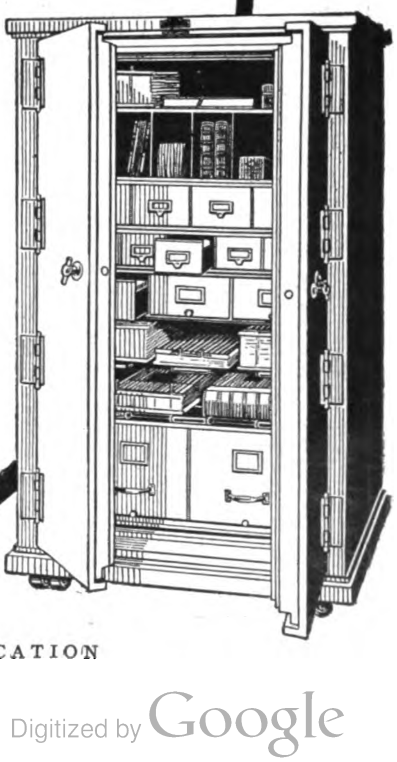

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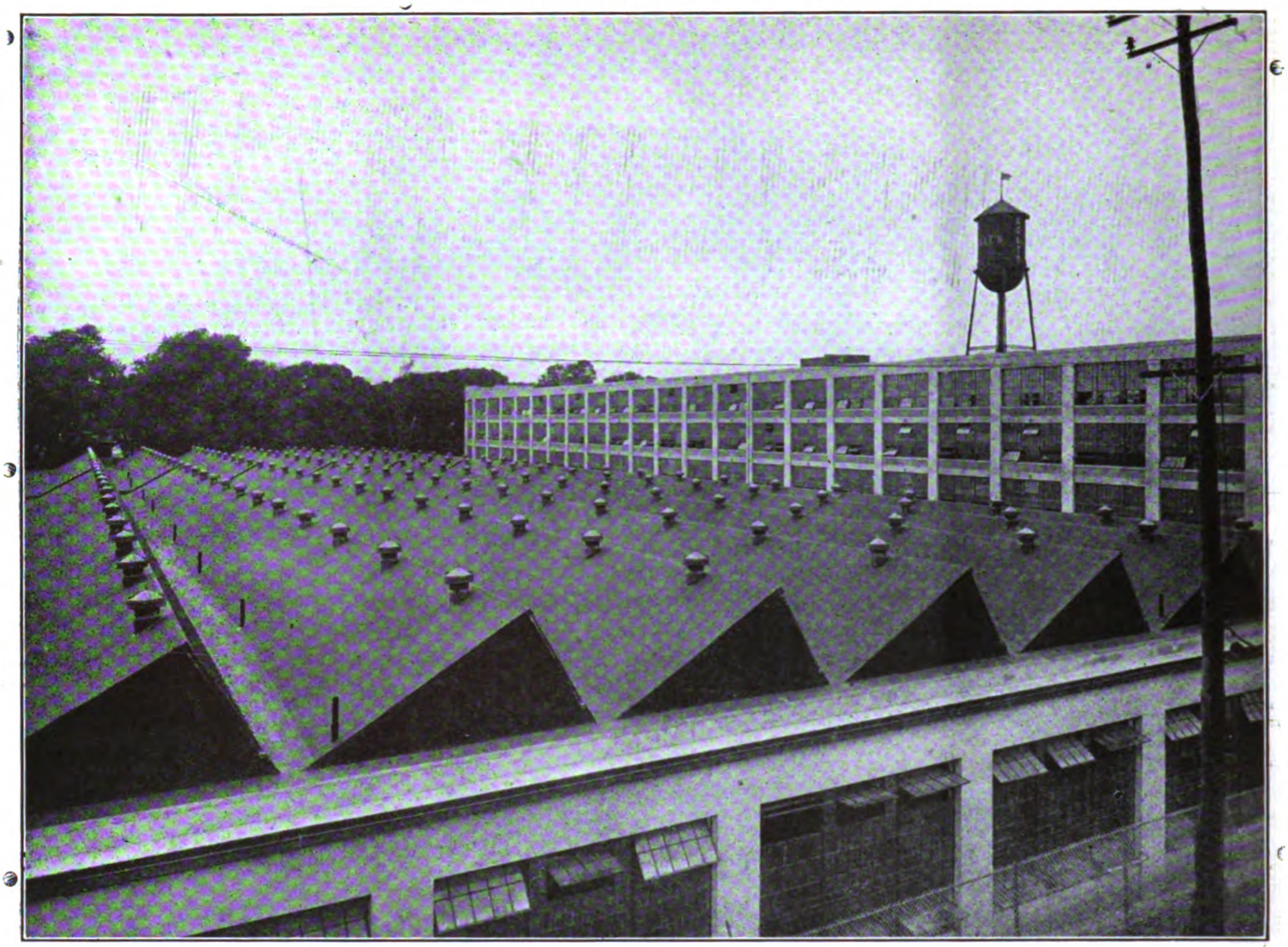

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VOL. VIII JUNE, 1919 No. 6

Prices of Building Products Advance

THOSE who deferred building early in the year in anticipation of a reduction in the cost of materials, now find they will have to pay increased figures for practically all products entering into construction work, with little likelihood of reduced costs for a long time to come. Discussing the present situation and the primary conditions responsible for the advances, the Dow Service Report says:

From a low level in building material movement last February to the present time building material movements out of distributers' yards to actual consumption on the jobs in Manhattan and Brooklyn there has been a gain of 104 per cent, all of which time has been marked by labor strikes in the building trades which have retarded work to almost war time extent.

During that time and up to within the last two weeks manufacturers of building materials have not been able to keep pace with the demand. This is especially true of common brick, lime, plaster, lumber, cement and concrete ingredients. The classification includes roofing materials. It has had its effect also upon fabricated steel, as shown by the fact that in the month of June 65 per cent of the country's bridge and structural shop capacity has been contracted for. May showed only 49 per cent, April only 24½.

Last week showed a further advance in the price of copper and an advance of 45 cents in the price per ton of cement lath mortar, both sanded and brown. One firm has advanced the price of bright wire nails from $2 to $5 a ton. The expected advance in plaster became effective last Monday. A change upward of 1 cent in plaster boards has become effective. Lumber price movements are decidedly forward. Figures on a small building operation near New York showed a difference upward of $114 in June because the owner hesitated to accept what he considered excessively high prices submitted to him thirty days previous. The prices for the same material today show an advance of nearly $200 over the first figure.

The trade expects advances in price of fireproofing hollow tile and wire lath, and another advance of 50 cents a thousand is to become effective on or about August 1 on wood lath. Paint interests have circularized the trade to the effect that big business is ahead, but at higher prices. The Standard Paint Company, as an example, is operating its new roofing plant night and day, and is still running behind its orders, and some of the largest varnish houses are increasing their plants with new buildings whose capacities are already taxed by forward orders. In consequence prices were advanced on July 16, with indications of a still further advance to be made later. Pipe prices are not considered stable.

Practically the only commodities that have not yet felt the latest price rise are structural steel, cement, common brick, domestic building stone and architectural terra cotta.

Building material market analysts reluctantly admit that if demand, checked as it is by strikes and lockouts in the distributing market, can so far exceed supply, settlement of labor disputes with a resultant free building market will bring about a price peak by the turn of the next building season that will greatly overtop any of the price levels ruling during war times or at any other period. Price levels can be held back only by maximum production at plants of all kinds, and some of the building material manufacturers have ordered capacity production to keep up with the demand, the Atlas Portland Cement Company, chief among those taking such steps. The manufacturers foresee the stampede for building materials that is already shaping itself when the day arrives that brings the final settlement on building trades wage disputes.

Defective flues were responsible for 150 fires, causing property damage of $202,282, in Minnesota last year, according to the report of State Fire Marshal Sanborn. The serious menace of faulty flue construction has frequently been emphasized in these columns, and architects and builders who are at fault in such direction, should be severely censured. Building codes in many cities are stringent enough in their requirements, but the difficulty lies in the lack of their enforcement. Next to wood shingle roofs, improperly built flues constitute the most dangerous fire hazard.

Motion Picture Theatres in Minnesota

THE amendment offered recently in the Minnesota Legislature amending the law of 1917 governing the construction of motion picture theatres and the operation of motion picture machines, failing of enactment, the former statute still governs.

The law of 1917 in part is as follows:

"SECTION 1. No cinematograph or any other apparatus for projecting or showing moving pictures, save as excepted in Section twelve of this act, which apparatus uses combustible films more than ten inches in length, shall be set up for use or used in any building, or in any place of human assemblage, unless such apparatus be enclosed in a booth or room of the dimensions and of one of the construction hereinafter specified.

"SECTION 2. Such booth shall be not less than six feet in height and shall be sufficiently large to permit the operator to walk freely on both sides and back of the machine and apparatus installed therein.

"SECTION 3. (a) If the booth or enclosure is constructed of brick, tile or concrete it shall have walls, floor and ceiling or roof not less in thickness than eight inches except that if reinforced concrete is used the thickness need be only four inches.

"(b) If the booth or enclosure is constructed of cement or plaster on expanded metal, or of sheet metal, asbestos or other approved fire-resisting material, such booth shall be constructed with an angle-iron framework. The angle-irons to be not less than one and one-half inches wide by one-quarter of an inch thick, the adjacent members to be joined firmly with not less than three-sixteenth-inch steel plates to which each adjoining angle- or tee-iron shall be riveted or bolted. The angle members of the framework shall consist of four outside horizontal members at top and bottom, four corner uprights and intermediate uprights on sides and ends and intermediate members on roofs spaced at least every two feet, but where expanded metal is used the studs and members may be made of folds in said metal.

"Cement or plaster on expanded metal shall be at least two inches thick and grooves or binders for gravity doors shall be securely fastened to the metal studding.

"Sheets of steel or galvanized iron then used as a covering for the frame, shall be of not less than No. 20 U. S. gauge, and sheets of asbestos board or other approved fire-resisting material shall be at least one-quarter of an inch in thickness. The fire-resisting material shall completely cover the sides, tops and all joints of such booth.

"Sheet metal shall be so cut and arranged that joints shall always come over a member and shall be overlapped and bolted or riveted to such member by bolts or rivets spaced not more than three inches on centers.

"Asbestos boards or their equivalent shall be so cut and arranged that vertical joints between boards shall always come over an angle- or tee-iron, to which such boards shall be securely fastened by means of proper bolts and nuts spaced not more than six inches on centers.

"The floor space covered by the booth shall be covered with fire-resisting material not less than three-eighths of an inch in thickness. The entire booth shall be insulated so that it will not conduct electricity to any other portion of the building.

"SECTION 4. The doorway to such booth shall be not less than two or more than three feet in width nor more than five feet ten inches in height. The door thereto shall consist of an angle frame of approved fire-proof material covered with sheets of such fire-resisting material as may be used for the construction of a booth. It shall close against a substantial metal rabbet and shall be so arranged as to close automatically when not open for ingress or egress.

"There shall be two openings in the booth for each machine, one for observation by the operator and one for operation of the machines, and other necessary openings for spot lights. These openings shall not exceed twelve inches by fourteen inches in dimensions and each shall be provided with a gravity door constructed of asbestos board or of sheet metal of not less than No. 14 U. S. gauge. Such doors normally shall be held open by a fine combustible cord fastened to a fusible link which melts at 160 degrees Fahrenheit and which shall be located within the booth directly above the moving picture machine. Doors shall be arranged to slide closed when released and when closed, shall overlap their respective openings two inches on each side.

"SECTION 5. All shelves, furniture and fixtures within the booth shall be constructed of non-combustible material.

"SECTION 6. Each booth shall be provided with a ventilating inlet on at least one side, said inlet to be approximately fifteen inches long and three inches high, the lower side thereof to be not more than three inches above the floor level.

"There shall also be an opening or vent in the ceiling or upper part of the side wall with a minimum cross-sectional area of fifty square inches, which shall communicate by means of a fire-proof pipe or flue with the chimney or outer air."

Roofing Ordinance Proposed for Indianapolis

SHOULD the following suggested ordinance now before the Indianapolis, Ind., Council pass that body, as it likely will, a forward step in fire-safety building will have been taken in the leading city of Indiana. The measure reads:

"Section 1. *Be it Ordained by the Common Council of the City of Indianapolis, Indiana,* That all buildings within the City of Indianapolis, except as hereinafter provided, shall have roof coverings of approved standard materials, such as brick, concrete, tile, slate, highest grade of tin, asbestos shingles, built-up roofing felt with gravel or slag surface, built-up asbestos roofing or other roofing of like grade which ranks as class A or B under test specifications as provided in Section 12 of this ordinance; provided, however, that this section shall not apply to the following buildings:

(a) Dwellings.

(b) Frame buildings.

(c) All buildings not exceeding two stories or 30 feet in height and 2500 square feet in area, and not used as a factory, warehouse, or for mercantile purposes, provided that said building is not located within the territory known as the fire limits.

"Sec. 2. The quality of roofing for all dwellings and other buildings exempted in Section 1 of this ordinance, may be therein specified for buildings not exempted, or if not, it shall be of grade not lower than Class C under the specifications of Section 12 of this ordinance.

"Sec. 3. For the purpose of this ordinance, roofings are divided into three classes as follows:

"Class A roofing must be so designed and constructed that it will withstand the Flame Exposure and Radiation Tests, provided for in Section 12 of this ordinance, at five and forty-mile air currents and the Burning Brand Test at five-mile air currents for at least sixty minutes, and the Burning Brand Test at forty-mile air currents for at least thirty minutes, without spread of fire from the area directly exposed and without sustained ignition of the roof deck. To be so designed and constructed that it will withstand all of the fire tests throughout their duration without glowing or flaming part being carried off by the air currents.

"Class B roofings must be so designed and constructed that they will withstand the Flame Exposure and Radiation Tests provided for in Section 12 of this ordinance, at five and forty-mile air currents and the Burning Brand Test at five-mile air currents for at least thirty minutes and the Burning Brand Test at forty-mile air currents for at least fifteen minutes, without spread of fire in excess of one-half square foot per minute from the area directly exposed and without sustained ignition of the roof deck. To be so designed and constructed that they will withstand all of the fire tests throughout their duration without glowing or flaming parts being carried off by the air currents.

"Class C roofings must be so designed and constructed that they will withstand all of the fire tests provided for in Section 12 of this ordinance, for at least five minutes without the spread of fire in excess of five square feet per minute from the area directly exposed, and without sustained ignition of the roof deck. To be so designed and constructed that they will withstand all of the fire tests throughout their duration without glowing or flaming parts of size being carried off by the air currents.

"Sec. 4. A layer of deadening felt at least 1/16-inch thick shall be placed between metal roofing and the supporting woodwork.

"Sec. 5. The wooden planking and sheathing shall not in any case be extended across the side or party walls.

"Sec. 6. Any roof having a pitch over 60 degrees, placed on any building over 40 feet high, except towers or church spires shall be constructed of iron or steel frames filled with fireproof material not less than 3½ inches thick and shall be covered with approved roofing.

"Sec. 7. All counter flashings shall be of metal properly incorporated with the roofing material.

"Sec. 8. The top and sides of dormer windows shall be protected the same as the roof, or with other material having equivalent fire-resistive properties.

"Sec. 9. No existing roof shall be repaired or renewed without permission or permit issued by Commissioner of Buildings. No existing wooden shingle roof if damaged more than ten per cent in area shall be repaired with other than approved roofing, and if damaged more than twenty per cent in area, the entire roof must be replaced with material specified in Section 1 or 2.

"Sec. 10. The Commissioner of Buildings shall have power to condemn and have removed any wood shingle roof that in his opinion is in such deteriorized condition as to be excessively inflammable.

"Sec. 11. Not later than ten (10) years from the date of the taking effect of this ordinance, any and all roofs covered in whole or in part with wood shingles or other combustible material, shall be replaced with roof coverings required of such buildings if constructed new under the provisions of this ordinance.

"Sec. 12. All roofing material must withstand the following tests for approval under the requirements of this ordinance:

"(a) For the purpose of making tests a standard deck must be made according to the following specifications: 8 feet long by 7 feet wide made of kiln-dried white pine boards 8 in. wide and ⅞ in. in thickness free from large or loose knots, sap wood or dry rot.

Boards to be dressed on one side and two edges and laid across a 7-feet dimension of the deck with rough side up and spaced ¼ in. and nailed to four 2 x 4-inch yellow pine battens on the under side of the deck. Two of the battens are located along the under edge and two 21 inches from these edges. The surface of the deck to be made as true and even as possible.

"(b) Samples of Roof Coverings: Tests samples in which are prepared roofing containing bituminous materials are used must be selected from stock between the thirtieth (30th) and sixtieth (60th) day after the roofing is manufactured. These samples must be stored for thirty days in freely circulating dry air at temperatures not less than 50 degrees nor more than 85 degrees Fahr. before they are tested.

"(c) Flame Exposure Tests: Two standard tests are subjected to the standard flame exposure tests in which the upper surface of the roof covering under investigation is subjected to the direct application of a gas flame over an area of approximately 6 sq. ft. One sample is tested while being subjected to air currents having temperatures between 50 and 65 degrees F. and a velocity of approximately five miles per hour. The other sample is tested under the same conditions except that the air currents are approximately 40 miles per hour.

"(d) Radiation Tests: The standard test samples are subjected to the standard radiation tests in which the upper surface of the roof covering under investigation is subjected to radiant heat from a steel plate, 12 in. distant heated to a temperature of 1200 degrees Fahr. One sample is tested while being subjected to air currents having temperatures between 50 and 65 degrees Fahr. and a velocity of approximately 55 miles per hour. The other sample is tested under the same general conditions except that the air currents are approximately 40 miles per hour.

"(e) Burning Brand Tests: Samples are subjected to burning brand tests in which the upper surface of the roof covering under investigation is subjected to direct application of a glowing brand 36 inches square; one sample being tested while subjected to air currents having temperatures between 50 and 65 degrees Fahr. and a velocity of approximately five miles per hour, and the other sample tested under the same conditions except that the air currents are approximately 40 miles per hour. The glowing brand shall be made of at least ten strips of seasoned hard maple 2 inches square by 3 feet long formed into a frame or grid with a 1¾-in. space between strips. The complete grid shall be thoroughly ignited and burning before application to the roof sample, which latter shall extend on one side at least 18 inches beyond the edge of the grid.

"Sec. 13. It shall be unlawful for any person, firm or corporation to store, handle, or maintain any roof covering material in the City of Indianapolis, for the purpose of sale or placing same on the roofs of any building in the City of Indianapolis, which does not comply with the requirements of this ordinance.

"Sec. 14. Penalties: Any person, firm or corporation who shall violate any provision of this ordinance shall, upon conviction thereof, be fined in any sum not less than ten ($10.00) dollars nor more than one hundred ($100.00) dollars for each offense to which may be added imprisonment not exceeding ninety days.

"Sec. 15. This ordinance shall be in force and effect from and after its passage and publication as required by law."

"Build Now" Movement

THE United States Department of Labor is energetically behind the "Build Now" movement, and is doing its utmost to have municipalities, corporations and individuals, contemplating building construction undertake the work without further delay. The futility of waiting for substantial reductions in the price of material and labor is pointed out, the best thought of the nation holding that we are permanently upon a higher scale of costs, and that all plans should be prepared with that idea in mind.

Vast Rebuilding Projects for France

A VAST reconstruction programme for France is proposed, the estimated cost of which is placed at eight billions of dollars. The scheme includes the reconstruction of railways, some of which will be electrified, with extensive projects for buildings, canals and harbor improvements.

Exposed by a Frame Church

Alleging that a recently built frame church exposes her property, a Mrs. M. M. Foley, in a Pittsburgh suburban town, is seeking the removal of the structure. It is alleged that a local building ordinance forbids the erection of frame buildings.

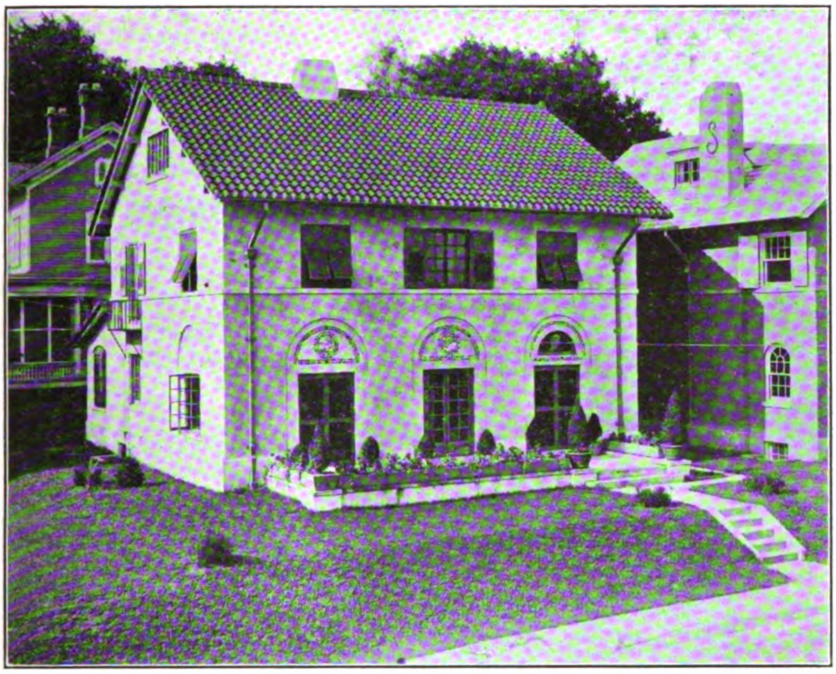
$100,000 Office Building at Birmingham

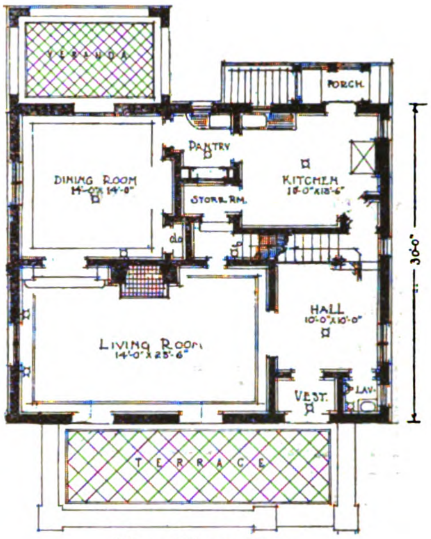
At a cost of $100,000 the Lincoln Reserve Life Insurance Company, of Birmingham, Ala., will erect a home office building, beginning work about October first. The structure will be of steel and stone, five stories in height, and thoroughly fire-resistive.

According to Atlanta, Ga., builders, no less than a thousand individual residences, and more than a dozen large apartments, are in process of erection in that city. It is anticipated, once the buildings now underway and contracted for in Atlanta, be completed, housing accommodations will be sufficient to meet present demands.

Types of Twentieth Century Homes

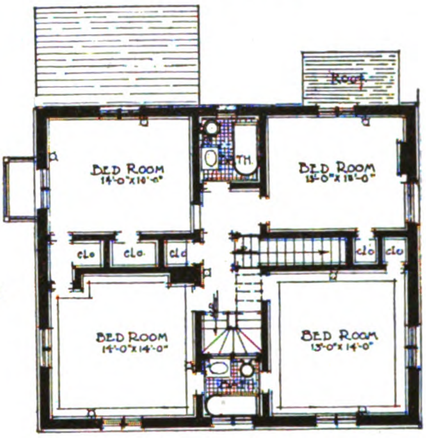
By **C. STANLEY TAYLOR**





First Floor Plan

Second Floor Plan

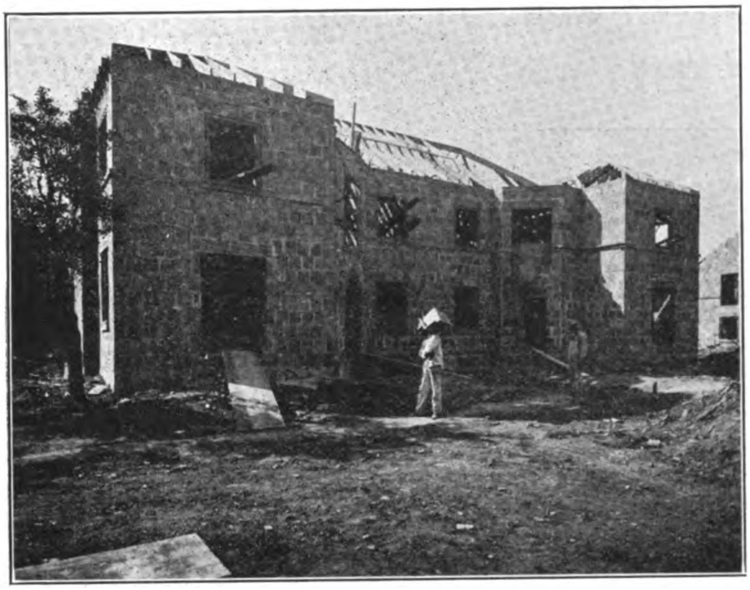


THE house shown above is one of an interesting group known as Ivy Court which is a suburban development near New York wherein the purpose has been to provide something better and more attractive than the average speculative real estate development. This house is modeled somewhat after the Italian stucco villa and offers a beautiful example of architecture showing the Italian influence in outline and detail, while interior arrangements have been made to conform to the climate and living conditions of this country. Through the medium of exterior design the house has been given marked individuality, although the methods employed are simple. The construction is of cement stucco on hollow tile with soft neutral colors in painting of exterior trim. The careful fenestration (arrangement of windows) and the pleasing details of doors combine in an harmonious effect. The house is built of fireproof construction throughout, cement stucco being applied directly on hollow tile exterior and principal interior partitions being of hollow tile. The windows are of the French casement type having swinging shutters of practical and interesting character, as shown in the illustration. Chimney is of concrete and roof of tile shingles. The detail of entrance doors and living room windows is enhanced by the use of soft colored tile inserted in the stucco in simple but pleasing patterns. All gutters and leaders on this house are of copper, which, while more expensive in the first investment, has considerable value in decreased cost of maintenance and resistance to damage by the elements.

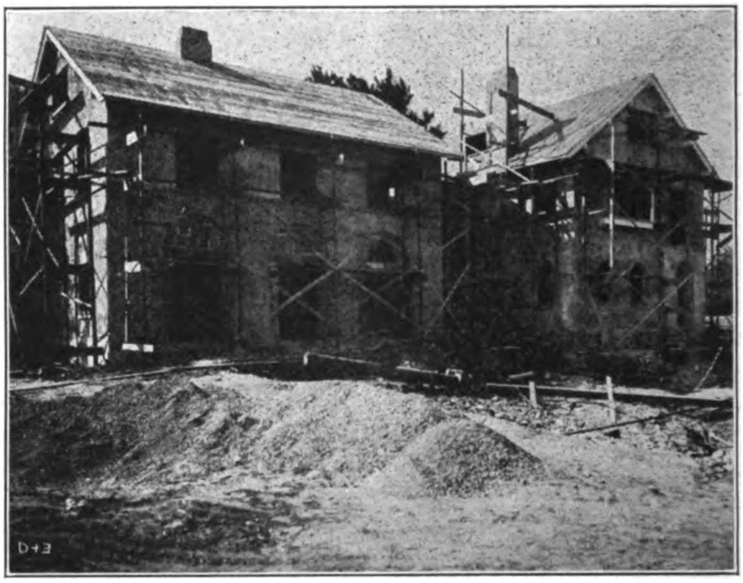
An interesting feature of this design is the small cement-floored court which takes the place of the usual porch. Embellished with simple planting this provides an attractive note in the facade view.

On the following page are shown two detailed views of this building in course of construction which will serve to explain the method of building with hollow tile and show also the natural advantages of this building material in the way of providing concealed air space which serves as insulation against heat and cold and is a protection against dampness.

Hollow tile as ordinarily used in the construction of a house are baked clay units each approximately 8 in. x 12 in. x 12 in. They are usually laid to form a square foot unit of wall space and a wall 8 in. thick. A hollow tile may be described in an ordinary way as a baked clay box with divisions or partitions for strength and support. In this manner the weight and other undesirable qualities of solid masonry are done away with, while strength and fire-resisting quality is not sacrificed. In order to build a house with cement stucco, exterior hollow tile are provided in special form for this purpose. These tile are of the



Hollow Tile Walls Ready for Coating



Stucco Being Applied to Hollow Tile Walls

ordinary type used in large buildings but having the exterior deeply scored, to provide a grip for the cement plaster, or, using a technical term, to provide a firm mechanical bond. The cement plaster when applied fills and dries in the grooves in the same manner that plaster dries and binds on wooden lath with the result that, when hardened, the cement stucco becomes practically a part of the wall unit.

Properly Erected Hollow Tile Houses Insure Permanency, Comfort and Low Maintenance Cost

Manuscripts More Precious Than All the Gold Above Ground

THE current issue of the *Insurance Monitor* appeals to the fire underwriters of America to renew the effort made by the National Board of Fire Underwriters and the Daughters of the American Revolution to remove the originals of the Declaration of Independence and the Constitution of the United States from the peril of destruction by fire.

These precious documents are in the building of the State, War and Navy departments in Washington, and are held, says the *Insurance Monitor,* "in an ordinary steel safe, surrounded by highly combustible material, which, in the judgment of the underwriters, would not stand a severe fire test for more than twenty minutes." The appeal continues:

> "According to that underwriters' report no less than five carpenter shops are located in its basement, surrounded by scores of rooms filled with highly inflammable contents, and the whole linked by open passages from cellar to garret to act as feeders for flames. Those who recall the destruction of the Equitable Building, believed to be fireproof, need not be told what must happen should a favorable fire once gain headway in this great national storage house."

These conditions, the *Monitor* says, were pointed out in a report made by the underwriters to the War Department a little more than a year ago and submitted by the Assistant Secretary of War to the Senate.

It would be a good thing for Congress to see to it that the priceless certificates of this nation's birth are beyond danger. That the State Department Building was considered safe when it was built is certain, for in 1877 Secretary Hamilton Fish, asking the return of the Declaration from the Patent Office, where it had been sent for safety by Daniel Webster when he was Secretary of State and when the Patent Office was under that Department, assured Zachariah Chandler, the Secretary of the Interior, that the new building was fireproof. The Declaration was kept in a cabinet in the State Department from that time until April 23, 1894, when it was put in a safe because the light was fading it. As to the fire conditions in the building today, there is the underwriters' ominous report. Some buildings that were considered fireproof thirty or forty years ago are regarded now as not even fire-resisting. --*New York Sun.*

Better Schoolhouses for North Carolina

Under a recent law plans for all schoolhouses in North Carolina must be submitted to and approved by the State Insurance Commissioner and the State Fire Marshal, before work thereon can begin. Standard flues and fire resisting roofs will be required in all cases.

Would Create a Bureau of Housing

HON. G. H. TINKHAM, of Massachusetts, is the author of a bill now before Congress, which proposes the establishment of a Bureau of Housing and Living Conditions in the Department of Labor. The purpose of the measure is to make available to the general public the mass of important building data gathered by the Federal Government in the course of its housing activities during the war; to study methods of reducing building construction, and to stimulate the building of homes, and thereby relieve the serious shortage in such direction that exists in practically all parts of the country.

After setting forth the need for the suggested Bureau, the measure provides:

"That to this bureau shall be transferred the collections of plans, books, pamphlets, reports, and other material gathered by the United States Housing Corporation and by the Housing and Transportation Division of the Emergency Fleet Corporation which would be of use for the purposes of the Act: Provided, That such materials shall not be transferred until they are no longer needed in the actual conduct of the business of these agencies.

"That the Bureau of Housing and Living Conditions shall be under the direction of a director, to be appointed by the Secretary of Labor, and he shall receive an annual compensation of $6,000. There shall be in the said bureau, unless otherwise provided for by law, an assistant director, to be appointed by the Secretary of Labor, who shall receive an annual compensation of $3,000; and such other assistants and employees as are requisite to the accomplishment of the purposes of the bureau at such compensation as may be fixed by the Secretary of Labor.

"The director of the said bureau may from time to time publish the results of the operations of the bureau in pursuance of the purposes of this Act in such manner and to such extent as may be prescribed by the Secretary of Labor.

"That during the continuance of the present Bureau of Industrial Housing and Transportation as created under the Act approved May 16, 1918, entitled 'An Act to authorize the President to provide housing for war needs,' the Bureau of Housing and Living Conditions shall be maintained in connection with the office of the director of said Bureau of Industrial Housing and Transportation, the operations of which in bringing to completion and disposal through the United States Housing Corporation the emergency housing undertaken to meet war needs it shall aid and facilitate.

"For the purpose of carrying out the provisions of this Act, including rental of offices in the District of Columbia, contingent and miscellaneous expenses, printing and binding, and personal services in the District of Columbia and elsewhere, there is hereby authorized to be appropriated $250,000."

Rules to Observe in the Dampproofing of Hollow Tile Houses

Hollow Tile Houses Properly Constructed are the Dryest Form of Masonry Construction.

Where There is Trouble From Dampness it May Result From Any of the Following Causes:

I Woodwork of Sills or Frames Has Shrunk Away From the Masonry.

Remedy. Pack the cracks with oakum or caulking cotton.

II. Stone or Concrete Sills or Belt Courses Run Entirely Through the Wall and Transmit Moisture.

Remedy. Paint the concealed faces of sills and belt courses with a bituminous or other waterproofing compound. If already built in, coat on the outside with a transparent waterproofing coating.

III. Holes in Hollow Tile Have Been Filled in With Mortar.

Remedy. Do not fill the holes, or where necessary to do this for beam support fill only the inside row of holes. If the holes straight through the wall have to be filled then coat this portion of the wall and a surrounding area three feet wide with a bituminous coating.

IV. Parapet Walls Have Been Carried Above the Roof.

Remedy. Look to the flashing and see that it is tight and carried above the line of melting snow.

V. The Building Has Settled and Opened Cracks Through the Walls.

Remedy. Build firmer foundations and avoid supporting tile on wooden lintels, girders or posts. If the building is completed, cut out the cracks and fill them with mortar mixed one part Portland Cement, two and one-half parts sharp sand and one-twentieth part hydrated lime.

VI. Hollow Tile Have Been Carelessly Set and Bedded on Their Side.

Remedy. It is too late to have a good mason do the work, and so defective plans, where they can be found, must be pointed up and made good and the plaster removed for a wide area around damp places and the tile coated with a bituminous coating and replastered while it is "tacky."

This Last Defect is Infrequently Found and Generally Results From the Employment of a Poor Contractor Who is Also Ignorant of Hollow Tile Construction.

In General. Mix the stucco for covering the hollow tile one part Portland Cement, two and one-half parts sharp sand and hydrated lime enough to equal 10% of the cement, mixing these ingredients dry until they are of uniform color, then adding water and properly tempering. Finish the stucco with a spatter coat, fine or coarse, according to taste.

Damp-proofing Hollow Tile Houses

[Those partial to hollow tile as a building product will read with unusual interest the subjoined contribution prepared by Mr. MacNeille, and extensively circulated by the National Fireproofing Company several years ago. The growing popularity of masonry types of construction, and the general interest shown by architects and contractors in the matter of damp-proofing, is our justification for reprinting the article at this time.—Editor CONSTRUCTION.]

By PERRY R. MacNEILLE

"IN every architect's experience the time comes when one of his clients will send an imperative message saying that his house is leaking badly, that serious injury has been done to the ceilings, and that men must instantly be sent to make good the damage. In many of these cases the trouble is from rain that has blown in through an open window and soaked through the floor down to the ceiling below. With the others the greater part is still from a window although this time a closed one. The wood in the window frames and sills, has dried and shrunk away from the masonry and opened cracks that even when small will admit a quantity of water during a driving rainstorm. This water will show in large damp areas around the windows and especially between the sills and the floor.

In hollow tile houses the inside plaster is applied directly to the hollow tile without any intervening space made by the furring which is necessary with brick, stone or concrete walls, and, therefore, many causes for dampness that the furring would hide in the latter forms of construction is attributed to the hollow tile in the former, and they are given the blame for dampness that comes from other causes.

One of these causes is in the use of concrete or stone for the window sills and for the ornamental projecting bands around a house. Stone is more or less porous, and concrete when mixed comparatively dry, is very porous, so that these sills or bands projecting through the walls transmit the water directly to the plaster and the capillary attraction in the plaster will often dampen surrounding areas of several square feet. In the case of the band courses these areas might be remote from the windows and give every appearance of dampness that had come directly through the hollow tile. Moisture has been known to creep up a wall from this cause to a height of two or more feet above the belt course.

Another cause is from roof water flowing into the hollow spaces in the hollow tile through defective roofs or through imperfect flashing. These wet spots may appear in any part of the walls, since the water will flow through the hollow spaces in the tile and only appear where its course is intercepted.

If any applied ornament or wood work extends through the stucco to the hollow tile and the joint between it and the stucco is not perfectly tight, water will enter in this way; or, if wooden beams come through the walls from the outside they will absorb and transmit moisture.

Last—although a less frequent cause than generally supposed—dampness is transmitted through the cement joints between the tile. Cement mortar, like concrete, is more or less porous when mixed dry and will transmit dampness, and there have been cases where dampness to the plaster inside has been caused in this way.

These causes of damp walls are the ones generally met with and when it has been determined which of them is the existing one in any instance the remedy is not hard to find. If the leakage is around window frames or under the wooden window sills, shreds of oakum, such as any plumber uses, can be forced into the cracks with a putty knife. It is better to use this oakum, as it comes, rather than soaking it in oil, as the oil is liable to stain the stucco. If windows and sills are treated in this manner while in course of erection, the possibility of future trouble would be obviated.

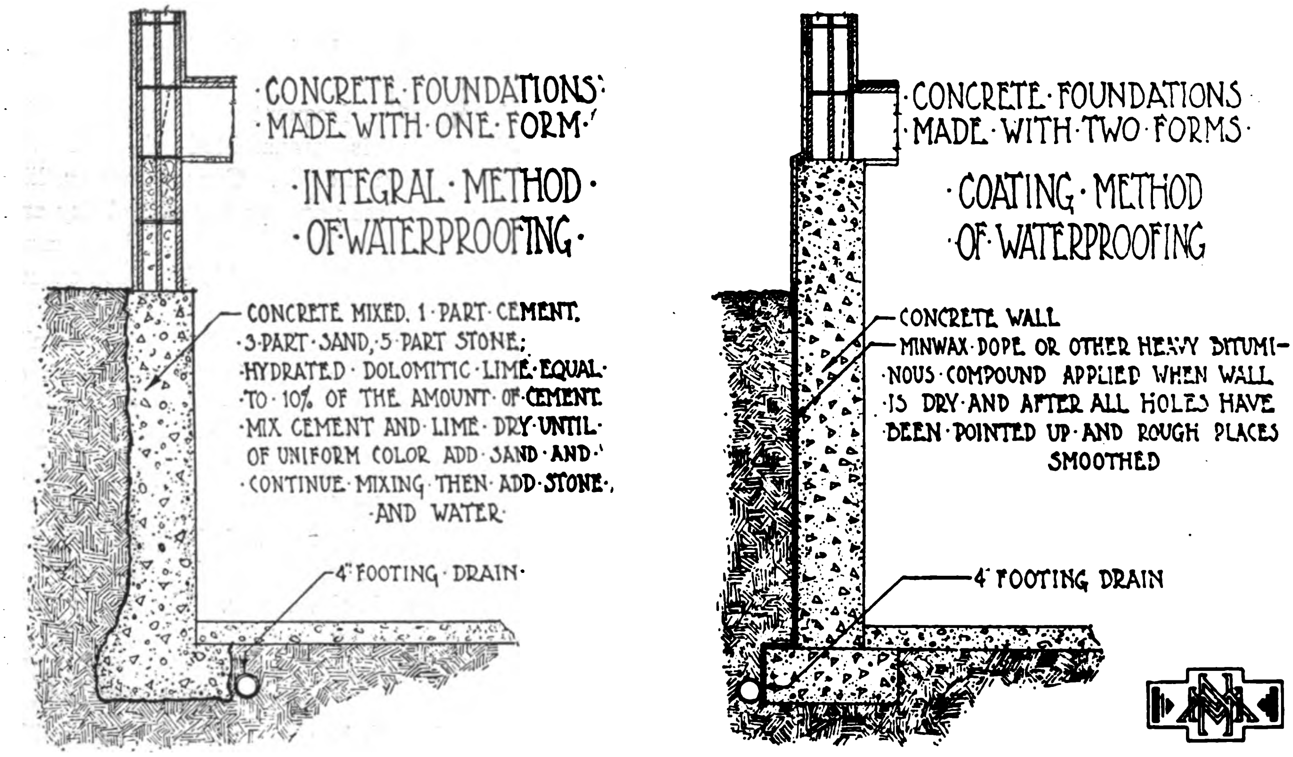
If the trouble is with band courses or window sills, these can be painted on the faces to be buried in the wall with Anti-hydrene or Minwax Waterproofing, or, if already in the wall, they can be painted on the outside with Edison's Waterproofing Paint or Minwax Clear Waterproofing Compound.

If trouble arises where flat roofs meet walls carried above them, these joints should be made tight with tin or copper flashing strips, made fast to metal roofs by soldering, or to gravel or slag roofs by running between two layers of the felt. This flashing should be carried up the wall to a height above which snow cannot collect, and then turned into a joint in the masonry.

Any danger from dampness coming through the mortar joints between the hollow tile can be avoided by mixing with the cement used in the mortar 5 per cent. to 10 per cent. of hydrated dolomitic lime or finely ground clay or by adding to the cement 2 per cent of waterproofing powder such as is sold by the Integral Waterproofing Company.

Until within a few years, hollow tile houses have been built of tile 12 in. square and of any desired thickness and covered on the outside with cement plaster or stucco, or veneered with brick. These coverings entirely conceal the hollow tile, and in a way, produced a sham architecture. Baked clay, as a material, is beautiful in itself, and when the hollow tile are made of the right texture, color and dimensions, very beautiful walls result.

A hollow tile known as "Textile" has recently been put upon the market which is unsurpassed in beauty of texture and shading. There is also tile that has the surface roughened to remove the semi-glaze that is natural to the tile and to give a surface somewhat similar to brick. Such tile as this is intended to be exposed in the finished work and it is probable that in exposed places some form of waterproofing them may be desirable. I say "probably" because there are many instances where uncoated and exposed hollow tile have withstood the weather and have not transmitted dampness.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SMOOTHED
4" FOOTING DRAIN

Detail Drawings of Concrete Cellar Walls

This tile can be waterproofed by coating it on the inside before plastering with Anti-Hydrene or with some bituminous compound, or it can be waterproofed on the outside by coating it with Minwax Colorless Dampproofing or Edison's Waterproofing Paint. The inside method of application removes any possibility of dulling the freshness of the texture of the outside of the walls, but is more difficult to make the coating continuous on account of pipe chases, beams and other parts of the structure.

By observing the recommendations given above the different damp-proofing difficulties in hollow tile construction will be overcome. There will still exist, however, those troubles met with in all houses in making dry cellars. These difficulties will have to be considered by themselves.

Waterproofing the Cellar

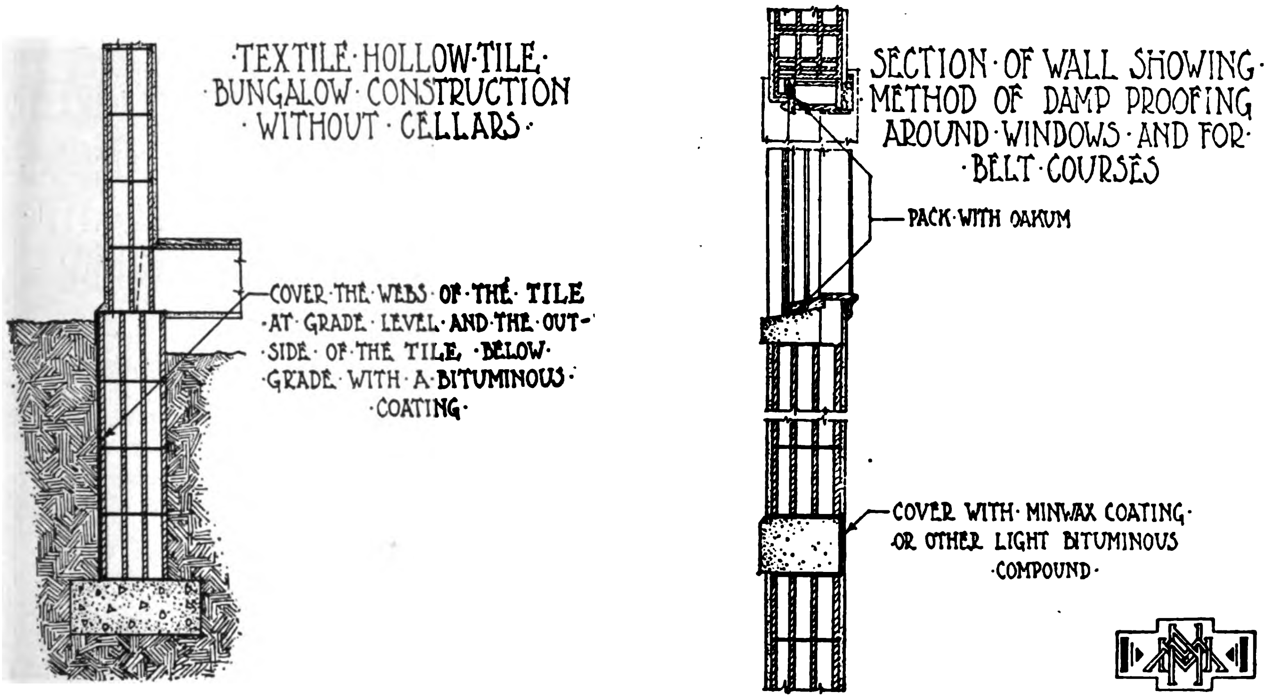
I have but twice seen a "flooded cellar," although my clients have often told me their cellar was flooded when there were a few puddles on the floor. The first flooded cellar was in a Philadelphia tenement, and the water stood about three feet deep after every rain storm, with the result that no attempt was made to use this cellar. The second flooded cellar was in my own house the morning after our main water supply pipe burst, and the memory of wading in this cold water to shut off the valve is only less vivid in my mind than my wife's reply to the foreman of the repair gang from the Water Company. He asked how long the leak had been running, and she said we could not tell until we saw our water bill.

But whether a cellar is flooded or simply damp, those living in the house have causes of complaint founded both on considerations of health, and on probably damage to the furnishings of the house, and it is therefore, an important duty of the architect to trace the causes of wet cellars and to find the remedies.

Causes of Wet Cellars

The causes of damp or wet cellars can be grouped under the following heads: (1), springs or underground streams; (2), surface water; (3), water from the roofs.

Permanent springs are rarely a source of trouble, since it is known in advance that they exist, and provision is made for them, but intermittent springs frequently cause trouble since they may not be discovered until after the building is completed. The reason for this is that they are caused by an intermittent flow from some natural underground reservoir.



Detail Drawings of Foundation Walls and Window Openings

A bowl in the rock or pocket in the sub-strata will slowly fill until it overflows, and then the flow will continue by syphonic action until the bowl is empty. Such action can be illustrated by filling a rubber tube with water, thrusting one end in a tub of water and holding the other end below the bottom of the tub. The water will flow out through the tube until the tub is empty. In the ground a seam in the rock or an underground water course replaces the rubber tube in the illustration I have given.

Water from an intermittent spring if intercepted by the cellar of a house may make its appearance through the side of the cellar wall, in the middle of the cellar floor or at any other point of weakness.

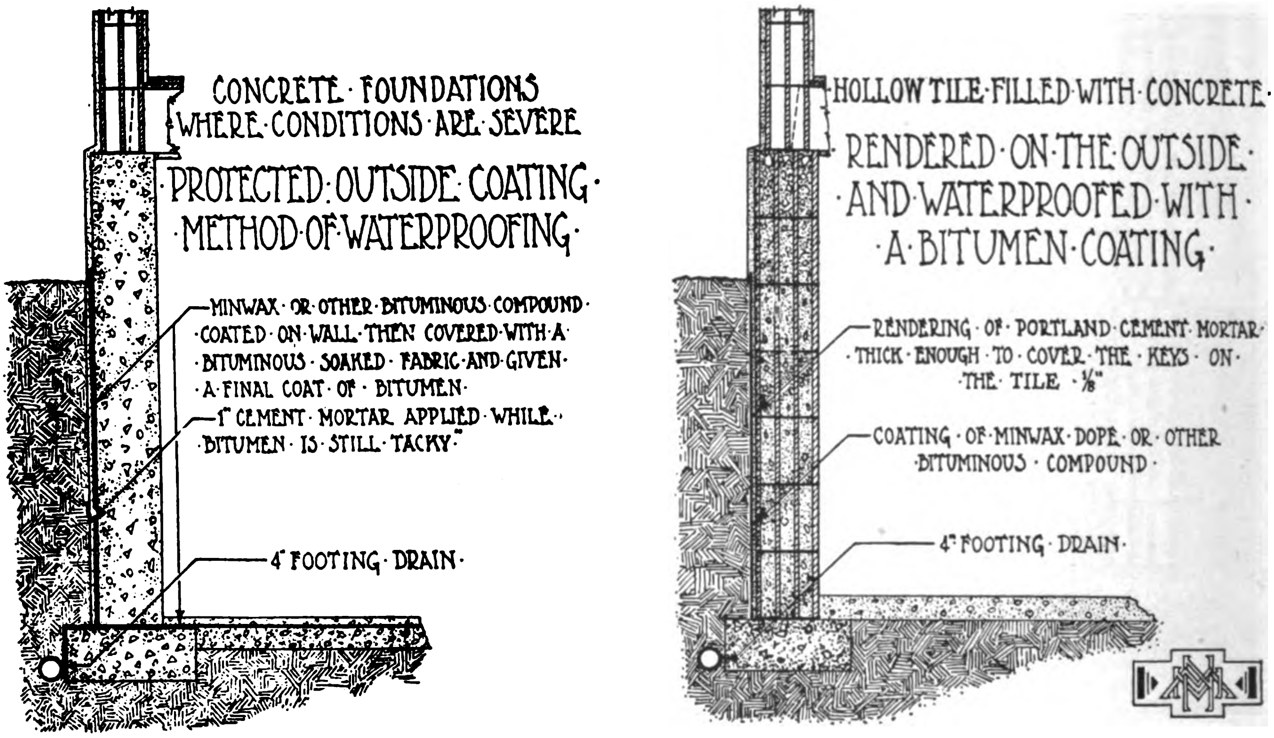
Water which flows in a broad sheet and oozes from the sides of the excavation is not generally from a spring but is surface water that has penetrated the soil until it has reached a denser strata over which it flows toward lower water courses. It will generally make its presence known in a cellar by causing dampness along the entire foundation wall that is nearest to its source.

Surface water will also flow directly into the cellar through the cellar windows during a rain storm, or, when it finds its way to low ground will so saturate the soil that water will seep into the cellar from all sides. It frequently happens that on high ground and ridges that would generally be thought dry, the rock or dense strata near the surface forms pockets which collect the surface water and create conditions almost as difficult to deal with as those in low ground.

Where the flow of water is continuous and large, the foundation work has probably intercepted the course of a former stream which has been filled in at some period of the city's development. These filled- as strength is required. In discussing the cellar and they cause great difficulty in the waterproofing of cellars.

While the natural causes of wetness and dampness that have been mentioned above are frequently met with, it is more often found that water in the cellar comes from causes immediately connected with the erection of the building. If the gutters on the roof have become stopped and the water overflows from them, it may find its way directly into the cellar, or, if the leader drains, that is, the underground drains carrying the water from the leaders, have been laid on soft ground, a slight settlement in them may open a joint through which the water they collect is emptied directly against the foundation walls. If the outlets to these underground drains are not adequate, or, if they are stopped up, or, if they are broken during building operations and remain unrepaired, they may cause dampness in the cellar.

It will be seen, therefore, that the causes for damp cellars are numerous, and it can well be inferred that the remedies are equally numerous, but cause must first be traced if the cheapest remedy is to be used.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4" FOOTING · DRAIN ·

Detail Drawings of Concrete and Hollow Tile Cellar Walls

Prevention of Wet Cellars

Cellar walls are usually made of concrete, stone, hollow tile or brick. Whichever material is chosen has to be used not only for the support of the structure above but also to act as a retaining wall to hold back the pressure of the earth so that weight as well as strength is required. In discussing the cellar problem, I shall assume a concrete wall to be used, since that can be waterproofed both by the integral and coating methods, while the other forms lend themselves to the coating method only.

There is little danger of a damp cellar in a gravel or sandy soil, but in clay or loam or on rocky ground, the danger exists even where the cellar is situated on ridges and in places supposed to have good drainage.

The surest way of preventing dampness in the cellar is to locate the house on high, well drained ground. Unfortunately, the conditions generally met with make this impossible, and where they do, the next best way is to run a drain around the outside of the cellar wall. Such a drain is generally called a footing drain, and it must be so located that the top of the drain is at least an inch below the top of the lowest point of the cellar floor. If this is done, the drain itself can be laid practically level, but it must have a point of discharging that will remove promptly all the accumulated water. Sometimes the surroundings are such that a point of discharge can be found in an adjoining ravine, or else the house can be kept sufficiently high, so that the discharge can be in the street gutter. Where neither of these ways are possible, it may be found that by digging a well in the center of the cellar deep enough to reach through the clay of loam soil down to a sand or gravel strata, and then filling the well with cinders or broken stone and connecting the footing drain with it, it will readily drain all accumulating water.

Having established an outlet for the footing drain, it is of next importance to see that the cellar walls are damp-proofed and that the damp-proofing extends down over the footings. The walls can be damp-proofed by making the surface reasonably smooth and then coating it with Minwax Dope or other heavy bituminous compound. The walls are prepared for this coating by removing or filling in with mortar all ledges, porous places and pinholes, and if this is well done one coat of the compound is enough. It must, however, be thoroughly applied. A hole no larger than the head of a pin will admit sufficient water to cause considerable trouble. It is the lack of full appreciation of this fact that results in many imperfect jobs.

After the walls are damp-proofed they should be back-filled with clean earth free from sharp stones that may bruise the water-proofing, and the earth should be well tamped. In a clay or loam soil the tamping or pounding of the earth as it is filled in, is in many cases the only precaution against dampness that is necessary, since it is with difficulty that water penetrates a dense, hard soil. Many mine shafts are water-proofed with only wet clay properly puddled. In building operations, however, it is so difficult to insure this tamping being properly done, that it is not advisable to rely upon it alone.

It often happens that a new building is surrounded by loose filled-in earth that readily absorbs rainwater, or that there are depressions where the earth has settled or that ungraded heaps of earth divert rainwater toward the cellar. By filling in around the house so that the ground slopes away from it, and by sodding or planting grass seed on the loose filled-in earth, any difficulty from surface water accumulating in this way will be overcome.

In some classes of work, cellars are built with concrete walls against the earth embankment to save excavating a working space outside the walls. When they are constructed in this way a wooden form is built for the inside face of the wall only, the earth embankment acting as the outside form, and thus no opportunity is given to apply the water-proofing to the outside of the walls. It then becomes necessary to mix with the concrete a water-proofing powder such as is sold by the Integral Waterproofing Company, or, if the concrete has a portion of cinders in the mixture, so that it is excessively porous, it will be necessary to put a coating about five-eighths in. thick of water-proofing cement mortar around the inside of the walls to any needed height, generally two feet up from the cellar floor. The Waterproofing Company of New York makes a dry cement mortar for this purpose called "Cow Bay Waterproofing Cement." Very excellent results have also been obtained in water-proofing concrete by mixing with the cement fine iron dust such as is sold by "The Master Builders."

The bottom portions or footings for inside and outside walls in damp places should be coated with Minwax Dope to prevent the water rising in the walls through capillary attraction.

Where cellars are so placed that there can be no outlet for the footing drains and the sub-soil is too dense to carry off the water through a drainage well, the cellar floor and walls must be made tight so that water under pressure cannot be forced through them. The height of the ground water outside of the building, or, the height to which the ground is generally saturated, determines the pressure against which the walls and floors have to keep out the water. On account of this pressure, methods of water-proofing that would otherwise be satisfactory, will not serve under these conditions. If the pressure is strong, it will force off any waterproofing applied on the inside of the walls, and it will rupture and force its way through any water-proofing on the outside of the walls that has not been put on with the greatest care and protected with an outer masonry covering.

It would seem, therefore, that the best way of waterproofing under these conditions, would be to make the walls and floors of concrete, which will itself be impervious to water. This can be done by a very careful proportioning of the mixture and grading of the aggregate. In doing this it is necessary to see that when the concrete is poured it is well puddled, and the mixture should be wet enough so that no tamping is necessary. As the concrete is being poured, it should be well sliced with shovels. Where any danger exists of settlement cracks, it is desirable to mix iron fillings with the cement, such as is done in "The Master Builder's" method, or to coat the outside of the walls with some bituminous compound. The iron fillings, on account of their continued rusting, will fill up small cracks and make them impervious to water. If the bituminous coating is used great care must be taken to see that the foundation upon which it is applied is smooth and perfect, and that some masonry covering is provided to prevent an abrasion or injury from the outside.

In private residences, cellar walls are frequently built of hollow tile construction and where added weight is necessary for stability against earth pressure the holes in the tile are filled with concrete. This does away with the necessity and consequent expense of forms to hold the concrete when it is being poured. These walls should be coated on the outside with cement mortar rendering. This coating may be applied in "The Master Builder's" method, or else, the tile wall can be carefully pointed and given a coating of ordinary Portland Cement Mortar rendering sufficient to cover the keys, and to this can be applied a bituminous preparation such as is prepared by the Minwax Company. When this is partly dry but is still tacky, a protecting coat of Portland Cement Mortar about one-quarter in. thick should be spread over it.

The same principles govern in water-proofing cellar floors under conditions of water pressure. A thin concrete floor should first be laid with a smooth surface upon which is spread a bituminous soaked fabric bedded in and coated with bitumen. This should be covered with concrete sufficiently heavy to keep back the water, the thickness depending upon the height of the ground water outside.

Where the pressures are light, a finished surface laid on the regular cellar floor in accordance with "The Master Builder's" method will probably be sufficient without the bituminous coating, but in any case the water-proofing should go through the walls and connect with the water-proofing on the outside.

In using any integral method of water-proofing concrete or mortar, that is, a method where the water-proofing substance is mixed in with the mortar, it is important that no settlement cracks develop and that there are no cracks resulting from the shrinkage of the concrete in drying. Such shrinkage will occur between the juncture of two days' work or at haphazard intervals in the surface of the wall. It is on account of the difficulty of preventing this that the users of iron fillings are enthusiastic about their methods, since the continued rusting of the iron supplies a filling substance for small cracks as they open. Others claim that bituminous water-proofing products which are miscible with water, if mixed through the mortar, will guard against these difficulties. My own feeling is that when the water-proofing problem becomes a serious one, it is best to rely on the reputation of the contractors performing the work rather than on the specific method which they adopt. Their reputation, however, should be verified by careful inquiry concerning the results of the work which they have done.

Public Garages to Be Made Fire Safe

OWNERS of public garages of frame construction at Portland, Oregon, have been given the option of vacating the properties or replacing them with buildings of fire-resistive materials before March 20, 1920.

Shingle Roof Fires at Raleigh, N. C.

Of the thirteen fire alarms turned in at Raleigh, N. C., during April last, eight were due to fires caused by sparks falling upon wood shingle roofs. The cause is easily removed, and it would be the part of wisdom for the authorities at Raleigh to follow the example of other progressive communities throughout the country and prohibit the further use of the fire-inviting wooden shingle as a roof covering.

The Norfolk-Hampton Roads Dry Dock and Ship Repair Corporation, of Norfolk, Va., will spend $7,000,000 for the erection of its plant. A contract for the construction of the buildings has been given James Stewart and Company, of New York City.

Cement Asbestos Shingles

THE National Fire Protection Association, the headquarters of which is in Boston, says in one of its quarterly publications, "Our contention is that there is no logical place in any prudent, well ordered community for the perpetuation of the conflagration-breeding shingle unless it can be shown that fire-resistive substitutes can only be obtained on prohibitive terms."

Our annual fire loss for some time has been around $250,000,000. A great deal of this total is piled up because of the spread of small fires due to the inviting inflammable shingle roof.

After each large conflagration, some official bodies "lock the barn after the horse is stolen" by out-lawing the fire hazard due to ordinary shingles. Already 91 cities in 18 states have passed laws restricting or prohibiting all except the use of fireproof shingles.

A good roof must embody durability, economy and beauty, and should also be weather and fire-proof. The inflammable shingle has but few if any of the above qualifications. It should be dispensed with.

Cement asbestos shingles meet the requirements just named. They are made of portland cement and asbestos, both of which mean weather and fire resistance. Not only are the materials of which these shingles are made, fire-resisting, but the method after which they are made combines the two ingredients so that all other qualities desirable for a good roof are obtained.

Cement asbestos shingles are only one-third heavier than wood ones and owing to this small difference in their weight, can in most cases be used to replace wood shingles without necessity of strengthening the roof frame. Like other well made cement products, cement asbestos shingles increase in strength with age.

Nearly everyone takes particular pains to select attractive plans and exteriors for houses and other buildings. Only recently have builders in this country followed the long time practice abroad of adding to the attractiveness of a roof by using color. No other shingles offer so wide a range of color choice and design from which to choose as do cement asbestos shingles and no shingles are better. Certainly no house built with a view to affording greatest resistance to fire is complete without a good permanent, fire-resistive roof. Cement asbestos shingles can be recommend to any person who wants to give the last touch of fire-safeness to the exterior of his building.

Cement asbestos shingles are manufactured by the H. W. Johns-Manville Co., New York, and the Keasbey & Mattison Co., Amber, Pa. These concerns issue attractive literature illustrating and describing shingles of their manufacture, and will be glad to send this literature to persons interested.

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The Fireproofing News

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LATEST EDITION

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New York City, N. Y., June, 1919

Priceless

Simplicity in Roof Construction

(Continued from May issue)

After all a life of from twenty-five to thirty years of a cheap material may pay for present consideration. Of course there is nothing like slates or tiles for endurance, but then there is nothing like pre-war prices for timber likely to come along again for many years, and so the coat must be cut according to the cloth.

"Notwithstanding the cost of timber, it may pay to use it where it will reduce the amount of brickwork, building by-laws permitting. Many picturesque and perfectly legitimate effects are obtained by contriving rooms in the roof, and in the past more cheaply than if carried up in brickwork. Now, if some form of concrete studding could be used, it seems it would solve a difficult problem very satisfactorily. It ought to be no more trouble to design a useful form of studding that could be cast in troughs or boxes like fence posts, and easily put into position. Of course such a studding would be heavier than a timber one, but it could be arranged for the weight to be carried direct on the walls beneath, if the house was planned accordingly.

"Again it might be a possible outcome of present conditions that domestic building may be designed with conical roofs like an Eskimo's snow house. A system of arched reinforced concrete pillars could be made and erected in the ground to lock into each other at the top and strutted into firm positions apart. The intervening spaces could be filled up with concrete blocks, or better still, slabs leaving a cavity between the outer and inner ones. The roof in this case should be dormered out, or could slope to the form of the pillars, in fact it would lend itself to a variety of treatments, none of them expensive. With a flexible roof covering, the timber to carry it would be but small in quantity.

"A small house planned to take a king post beam over an inner wall might have this made of a light scantling in reinforced concrete. There will be plenty of lengths of iron barrel, rodding, strong barbed wire, etc., to be had second-hand very shortly, and some use of these may be made in this way for small light work. Some of this barrel, etc., may also be used alone to take strains and stresses in a roof, leaving the timber to be used only where absolutely necessary. In such ways the ordinary forms of roofing may be followed at little extra expense. Again, with a light roof covering the timber required could be reduced to a low minimum.

"After all it must be admitted that timber is scarcely an ideal material of which to form roofs. It is inflammable, liable to rot, and to harbor vermin. Certainly present conditions will eliminate timber as much as possible from house building in the near future.

"The avoidance of skylights will also be imperative in the future of roof plans, and if this is brought about, the great war will add to its roll of minor benefits, for few things connected with roofs have given so much trouble as these in the past. This fact is so undisputed that most architects will go to a lot of pains to avoid them. The trouble hitherto has resulted from a rather pigheaded adherence to certain forms of these roof lights, and to the placing of them in bad exterior positions.

"Where a skylight is quite unavoidable and it is not required to open at all, the best form is the glass tile. These are made in several shapes and may be had quite plain like a slate. They are of toughened, tough glass, of tile, or ordinary slate, thickness. They can be fixed like any common tile, and two or three inserted in the usual way over the desired spot, with the ceiling beneath boxed up to them, make the most effective and least troublesome skylight one can have. The writer has seen many of them in different places, and has never found one to cause annoyance. The rain simply runs off as it does off the other tiles, and any moisture that may be inside is due to condensation, as may happen to any skylight.

"Where the roof is rather flatter than usual, and plain pieces of roofing glass are used in conjunction with a slate covering, it is well to increase the lap, and it may be well to bed down the edges on a little special cement to prevent any capillary attraction. This cement is made of whiting or sirapite, 7 parts, silver sand 2 parts, red-lead 3 parts, finely powdered resin 1 part. Mix these well together dry, and then make into a stiff paste with linseed oil "footings" or oil varnish. Paint a band of this ¾-in. wide half an inch from the lower edge of the glass, and bed gently down.

"In conclusion it may be pointed out that on the score of economy it is recommended in the Local Government's Housing Committee's report, that 'simple, straightforward roof lines be adopted, and the multiplication of dormers, flats, gutters, and other complications of the roof structure should be avoided.'"

Wooden Roof Hazard Shown

Salt Lake City, Utah, was visited by 304 fires in buildings last year, and fifty-one of them, or seventeen per cent, were due to blazes originating from wooden shingle roofs, according to the annual report of Fire Chief W. H. Bywater, who recommends to the City Commission the enactment of an ordinance prohibiting the use of wooden shingles in building roofs. One hundred and thirty-two fires, other than in buildings, were reported. During the year 1918, 13,459 inspections were made. Chief Bywater gives praise to the management of business houses for the work accomplished in the matter of fire prevention, paying tribute to those responsible for the elimination of refuse from premises, thus greatly minimizing the fire menace.

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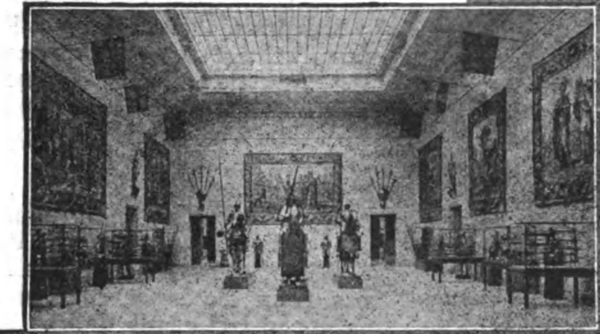

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To secure perfect bond between the old and new material requires the removal of all loose particles, dust and foreign matter from the old concrete base, and then thoroughly steam cleaning or washing the base before applying any new material, then apply a new fresh base and finish topping monolithic with new base.

The hard set old concrete that remains is uneven, ragged, etc., therefore the cement must be of such fineness that it will permeate everywhere, between, among and over each and every particle, filling all interstices with its own tough and adhesive substance and spread its strength so uniformly throughout the mass so that homogeneity of the structure is with certainty secured, thereby overcoming almost entirely those defects of expansion and contraction which are generally caused by a lack of uniform densification and bonding of the completed mass.

Waterproofing Old Walls

Old walls can be made absolutely water and moist-proof by using one part of Advance Reground Waterproof Portland Cement to two parts of clean sharp torpedo sand and proper amount of pure water, as a plaster coat over old concrete, brick work, or stone work.

Before applying the new plaster coat the old work must be absolutely cleaned and all loose portions and dust or foreign matter removed.

Mortar coatings are equally reliable, whether used on exterior or interior surfaces, because they will resist successfully hydrostatic pressure even when the pressure comes from the side opposite to which the coating is applied. This is because Advance Reground Waterproof Portland Cement forms a perfect bond with the structure, and some advantages of application to interior surfaces are economy of working space in construction, immediate detection of necessity for repairs if any, also permits a perfect connection between the floor and wall waterproofing.

The faculty of Advance Reground Waterproof Portland Cement to form a perfect bond with the structural material really makes the waterproof coating an integral part of the structure, and consequently the waterproofing coating will successfully withstand any water pressure which the structure itself will resist. In other words the waterproofing will be as strong as the structure itself.

Reject a Fireproof Adjunct

Upon the claim that the fire-proof clause in the general appropriation bills would lead to such heavy expense that it would be unwise to retain it, the finance committee of the Texas senate struck it out.

Senator Woods requested State Fire Marshal Inglish for an opinion concerning the policy of the state the past few years in having all of its buildings conform to fireproof construction. 'Marshal Inglish, in answer stated that, in his judgment, such a policy was absolutely sound, and, in the course of time, the most economical. Marshal Inglish wrote:

"This office can think of no reasonable argument why such a policy should not be pursued, outside of the argument of the initial cost, and this argument is not well taken if comparison is made between the cost of up-keep, repairs, insurance, etc., and the danger to life is taken into consideration, and those of the other type of construction which have never been and are still nothing more nor less than fire traps, if such a comparison is allowed over a period of a few years, it will be found that the initial cost argument is fallacious, even from an economical standpoint.

Only Old Buildings Burned

"It will perhaps interest you to know that since January 1, 1911, Texas has sustained losses from fire to the extent of $900,000, all of which loss has been on the old nonfireproof, or, to be more exact, nonfire resisting construction. In other words, in all of the buildings erected by the state since the adoption of the policy to require fire-resisting construction, and to require plans and specifications with reference to said construction and the installation of fire-protection equipment to be approved by this office there has not been $25 loss in the buildings erected under such supervision.

"The term 'fireproof construction' as construed by this Department, in passing upon plans and specifications are those recognized by the best engineering practices, and those which have been agreed upon by competent architects and fire-prevention engineers as absolutely essential to provide the maximum of safety to both life and property, and accomplish the purposes for which the buildings are erected.

"The policy as applied to the repair of old structures has been sufficiently flexible to obviate any hardship, or any unnecessary waste of old material, and has tended to improve safety, prolong the life of the building and increase its utility.

"No policy of the state government has been as beneficial, from the viewpoint of permanency, beauty, utility, safety and economy as the policy requiring fireproof or fire-resisting construction in all of its new buildings."

No More Pasteboard Houses

"There appears to be a divine compensation in the way things dovetail together," says the Augusta, Ga., "Herald" in an editorial and adds: "About the time the fire hazard becomes the national menace, we discover that our timber resources are getting exhausted, and that there will be no more cheap lumber for a Nation's homes."

While Europe was building for 500 years America built for five, or for 50 at most.

Lumber was cheap, labor was expensive, cement was not utilized as it is today, and so the shack was the rule rather than the exception.

Shack Remains a Shack

And though we gilded the shack, and dressed it up, and put modern plumbing inside and fancy porches without, and hung gables and porticos and all manner of expensive frippery about it, still it remained, fundamentally, a shack that would wear out in a few years, if it did not burn down sooner.

So we had the most efficient fire department on earth, and the greatest fire loss on earth, and the biggest insurance business, and some of the most clever arsonists out of prison.

And that was an unusual day that did not report at least one family burnt to a crisp while it slept.

But now we are discovering that it pays to build fire-proof homes as well as factories, and that the brick wall, the concrete wall, the metal lath, the slate roof and the stucco finish make for homes that are warm when they should be warm, and cool when they should be cool; the precise reverse of the shack system that baked you in the summer, and put you into cold storage in the winter.

We will pay less for protection and more for masonry; less for pneumonia and more for concrete basements; less for shingles and more for fireproof roofing, and the average American home will endure long enough to have a few memories and traditions; to become a home.

And maybe, when we have real homes that do not require a corps of carpenters to prop up, we will quit moving every May day and stick in one neighborhood long enough to plant a rose and pick its bloom.

$500,000 Building to House Motion Picture Producers

An investment of $500,000 will be made by motion picture producers and film distributors for the erection of an exchange and office building at Kansas City, Mo. This building will be twelve stories high and 115 feet long by 50 feet wide. It will be constructed of brick, terra cotta and concrete, with tar-gravel roof and concrete floors, a $14,000 steam heating plant, a $35,000 equipment of electric elevators and electric lighting installation.

In association with George E. Strehan, Rudolph P. Miller, formerly superintendent of buildings in Manhattan, has opened a general engineering office at 112 West 42nd street, New York City. The new firm is prepared to "design building construction, masonry, structural steel, reinforced concrete and foundations; to conduct soil examinations and tests of materials; to make inspections and surveys; to arbitrate disputes, and to prosecute petitions and appeals before the Board of Standards and Appeals."

Recent incorporations of building and building supply concerns include the following: Farmingdale Construction Company, New York City, capital $25,000; Owners Improvement Corporation, New York City, capital $50,000; Eureka Repair and Building Company, New York City, capital $25,000; New Jersey Cement Products Company, Camden, capital $150,000.

Advance agents of the Lime Association are credited with having induced the initial purchase of 100,000 tons of lime, upon construction projects in which lime would probably not have been used had it not been for the intelligent activity of the Association representatives. The result indicates what any industry manufacturing a desirable product can do if co-operative and modern publicity methods are employed.

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WITH A DEPARTMENT DEVOTED TO

SAFE HOMES

JULY 1919

VOLUME NINE NUMBER ONE

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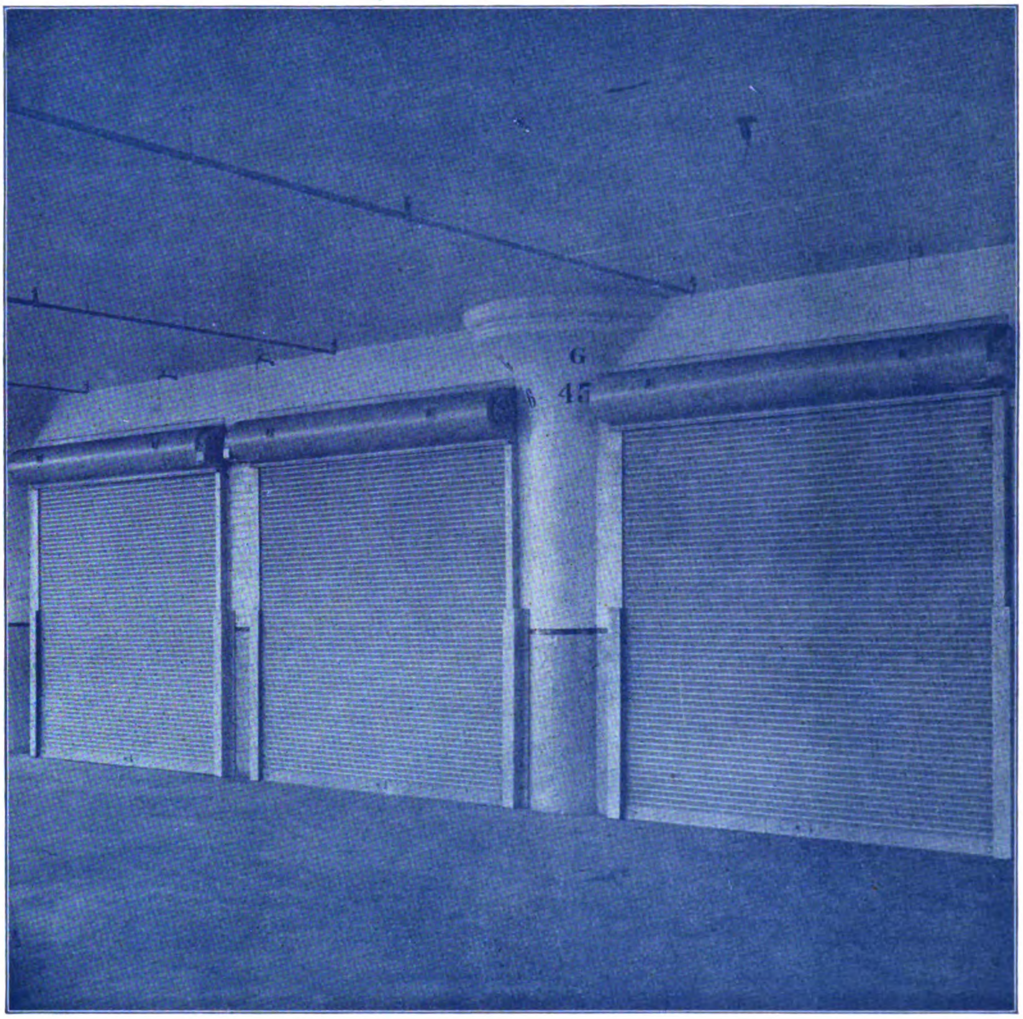

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George A. Watson, Editor
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Volume Nine
Number One

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ADVOCATING THE CONSISTENT VSE OF
FIREPROOFING MATERIALS & PROTECTIVE DEVICES

VOL. IX JULY, 1919 No. 1

Building Activity Greatly Increased

BUILDING contracts awarded during the first half of 1919 in that portion of the United States east of the Mississippi River and north of the Ohio River, totalled $989,904,000, according to statistics compiled by the F. W. Dodge Company. This indicates an increase in volume of operations of 23 per cent. over the average volume for similar periods of the five years preceding 1919. This notable increase has taken place in spite of the many conditions which at the opening of the year were looked upon as deterrents to the resumption of building activity.

At the opening of the year the majority of people were either puzzled or pessimistic about the outlook for building activity in 1919. Prices and wages were high in comparison with previous years, and almost every one expected declines. Rents and property values had not, in general, advanced sufficiently to give prospective builders the prospect of an adequate return on their investments at prevailing costs. In view of the uncertainties inherent in the situation, bankers were slow in making loans on building ventures. Pessimism regarding the outlook was fairly widespread.

Prices Keep Up

In spite of slackness in business, prices did not drop. Government bureaus and other agencies gave nation-wide publicity to the underlying economic conditions affecting prices and wages. These factors increased public confidence in the stability of prevailing costs. In the meantime, rents and property values advanced considerably, reaching a figure bearing a normal relation to current prices and wages.

In addition to these things was the pressure of actual building needs. The country was several years behind on its normal building programme. The shortage of housing facilities and of buildings for industrial purposes was very great. The public, which had seen an enormous volume of business done at high prices during the war, soon learned that the same thing could be done in peace time.

Future Activity

It seems likely that the present volume of activity will continue for three or four months to come. Toward the close of the building season it is possible that the amount of contracts awarded may show a slight decline. However, judging from the amount of building needs not yet taken care of and the enormous increase in activity that has been witnessed during the first six months of the year, it would appear that 1919 will go down in the history of construction activities as a banner year. In view of the uneasiness with which the public viewed the business situation in January, the rapidity and the extent of the recovery have been remarkable.

The values involved in contracts awarded during the last six years (January 1 to July 1 inclusive) in the territory east of the Mississippi and north of the Ohio rivers were as follows:

1919	.....$989,904,000	1916	.....$596,583,586
1918	 911,714,000	1915	 413,532,600
1917	 831,402,000	1914	 382,532,000

The following table indicates the value of contracts awarded for the same periods in New York State and northern New Jersey:

1919	.....$194,584,000	1916	..... $74,922,500
1918	 135,001,000	1915	 72,558,000
1917	 155,281,000	1914	 65,926,000

Building Work in New York State Authorized in May

THE estimated cost of building work authorized in first and second-class cities of New York in May exceeded the similar amount for any previous month since July, 1916. The amount is about $23,600,000, of which $20,000,000 is reported for New York City. This is more than double the amount authorized in May of either 1918 or 1917. Of the May total the estimated cost for new building is $18,400,000. These figures were compiled by the Bureau of Statistics of the New York State Industrial Commission from reports submitted by the Superintendents of building construction for the 10 largest cities of the State.

Organize to Build Hudson Tunnel

THE New York State Bridge and Tunnel Commission and the New Jersey Interstate Bridge and Tunnel Commission, which have charge of the construction of the vehicular tunnel between Manhattan and Jersey City, have organized by appointing Clifford M. Holland, formerly of the staff of the Public Service Commission of the First District, their chief engineer and completing the establishment of their office force.

The States of New York and New Jersey have each appropriated $1,000,000 for beginning the work, the total cost of which will be $12,000,000. It is expected that the tunnel, which is to extend from Canal Street in New York City to Twelfth Street, Jersey City, will be completed in three years. The plans provide for a single tube with two decks, each wide enough to accommodate three lines of vehicles or for twin tubes with decks wide enough for two lines of vehicles.

A Board of Consulting Engineers has been appointed, consisting of J. Vipond Davies, Colonel Henry W. Hodge, Colonel William J. Wilgus, Major John A. Bensel and Professor William H. Burr. Each is to receive a salary of $10,000 a year. Edward A. Byrne, Chief Engineer of the Department of Plant and Structures, also named as a consulting engineer, will receive no compensation, because of his connection with the City government.

The duties of the consulting engineers will consist of advising the Chief Engineer of the Commission, to follow the progress of the work, and to report formally to the Commission every quarter.

"This will be the first highway tunnel built in America," said Mr. Holland, "although there are two in England. The Rotherhithe, built in 1908, and the Blackwall, built in 1897, both under the Thames, have been very successful. They were built by the shield method—that is, where an outer shell or shield is pushed forward as the real tunnel is built within. The question of ventilation that has given rise to so much debate is a negligible quantity.

"The type of tunnel, too, is still to be decided on. The most acceptable suggestions provide for a single tube of two decks, each accommodating three lines of vehicles, and for twin tubes with the same vehicular capacity. Both types have their advantages and disadvantages, and we will make up our mind only after a careful study of the details."

It is estimated that when actual work begins, 2,400 men will be kept busy for a period of nearly four years.

Cotton Warehouse to Cost $2,000,000

As a step toward realizing a long-cherished ambition of being the largest spot cotton market in the United States the initial contract for erecting a cotton warehouse to cost $2,000,000 has just been awarded by the Dallas Cotton Warehouse Company of Dallas. The building site is now being graded. The first unit will be a four-story reinforced concrete fireproof structure, 50 by 130 feet, with a storage capacity of approximately 60,000 bales of cotton, and will cost $700,000. With the other units added the total storage capacity will be brought up to about 400,000 bales.

Large Buildings Planned for New York

AN unusual number of plans for large and expensive buildings have recently been filed in New York City, and still others are reported as in contemplation. Prominent among the structures already determined upon are the following:

Cunard and allied steamship lines building at 25 Broadway, which will be twenty-one stories high and will cost $5,140,000. R. W. Morris of 101 Park avenue is the architect.

Next in importance was the proposed twelve story home for the Kerr steamship lines at 38 to 46 Beaver street, which is to cost $580,000. The structure will occupy a plot 98.11x65.3 and will be erected by the Kerr Realty Company of 17 Battery place. Warren & Wetmore of 16 East Forty-seventh street are the architects.

Plans were filed for the eleven story apartment hotel to be erected at 60 to 66 West Sixty-eighth street by the Sixty West Sixty-eighth Street Realty Company, Inc., of 300 Eighth avenue. The hotel will cover a plot 76.3x83.5 and will cost $430,000. G. F. Pelham of 200 West Seventy-second street is the architect.

S. Strauss Sons Company filed plans for a thirteen story show room and office building for the northwest corner of Madison avenue and Thirtieth street, lot 24.9x98.9, to cost $150,000. T. A. Mayer of 114 East Twenty-eighth street is the architect.

Miami, Fla., Prepares Building Code

As befits a progressive community Miami, Fla., has prepared a thoroughly modern building code, governing the erection of new structures and the repairing of old ones within its borders. Gratifyingly too the code takes a deserved slam at fire breeding wood shingle roofs.

Structural steel mills report a steady increase in operations, a number of substantial contracts having been received during the past thirty days. Prices continue firm and will likely remain so for an indefinite period.

A fusing metals plant will be built at Fairmount, W. Va., by the West Virginia Metal Products Corporation.

Relief Valves for Air Line Sprinkler Systems

A SPRINKLER leakage loss amounting to $14,696, covered by $31,500 insurance, which occurred at St. Louis on July 12, is the subject of a special report by the St. Louis Fire Prevention Bureau. This loss illustrates the necessity of installation of reliable relief valves in airlines, not only in new equipments but also in old equipments where, for lack of experience or definite rules governing at the time of installation, relief valves were omitted. The loss was in the plants of the J. H. Conrades Chair Company and the Scharff-Koken Manufacturing Company, at the northeast corner of Second and Taylor streets. The special report is in part as follows:

"On July 12, 1919, about 10 A. M., the head of one end of the pressure tank for the sprinkler equipment blew out with a loud report and great force, apparently loosening at the bottom first, blowing the head partly through the roof, breaking some sprinkler pipes, then falling down on the floor breaking holes through the floor as it fell.

"The tank had been pumped up by the engineer about an hour before, and a few minutes before the head of the tank let go one of the employes on the floor observed that it was leaking around the end rivets; he notified the factory manager, but before the manager and the engineer could reach the tank or release the pressure the head blew out. This tank was located on the sixth floor, half way through the brick division wall of the two six-story, brick, joist constructed buildings, marked 'D' and 'E' on Sanborn's map, its principal support being the division wall, the ends resting on wood cradles. The force of the recoil when the head blew out, broke the discharge pipe under the tank and threw the tank itself back about eight feet.

"This tank was installed by the Providence Steam & Gas Pipe Company in 1889, having been in continuous service ever since. It was approximately 5 feet in diameter and 20 feet long, having a capacity of about 3,000 gallons, being kept two-thirds full of water with 75 to 80 pounds air pressure. The shell was in three sections; the longitudinal seams were triple riveted; the girth seams and heads were single riveted; the rivets being ⅝-inch and spaced 1½-inch on centers. The thickness of the shell plates was ¼-inch and thickness of the heads ⅜-inch. Metal of the tank in general was found to be in fairly good condition, considering the length of time the tank has been in service; however, some places in the lower part of the shell and the heads, which had been constantly under water, had been reduced by rust and corrosion in the very thinnest places approximately from the original ¼-inch to ⅛-inch in the shell and from ⅜-inch to 3/16-inch in the heads. The tank has been cleaned several times and slight leaks have been calked, but no serious defects have shown in the

"Under the assumption that an excessive pressure had been pumped on this tank, investigation was made, but no evidence has been obtained to verify this assumption; the engineer maintains that the pressure which he had pumped on the tank that morning did not exceed 80 pounds, and we, of course, are not in position to contradict this statement. The pump which is used is a Westinghouse steam pump, 10x18 inches, supplied from high pressure boiler maintaining about 115 pounds of steam; there is no relief valve in the air line from the pump to the pressure tank. The pressure gauge at the pump, by which the engineer was guided when pumping, was tested by this Bureau the following day and found to be correct."

Large Construction Work at Baltimore

Local capital of Baltimore to the extent of $3,000,000 will be invested to build docks, warehouses, sheds, etc., and install handling facilities on the water front. This is to be a complete industrial system, including the ultimate erection of 8 piers and 32 buildings, some of the latter to be utilized for manufacturing purposes. Included in the plans and specifications is a pier to cost $825,000, to be 12,000 feet long by 200 feet wide; two warehouses costing $1,800,000; approaches costing $400,000; bulkhead to cost $100,000; pier equipment costing $40,000, etc. The names of the capitalists interested have not been announced, but it is known that F. W. Kesselbaum, of Mt. Washington a suburb of Baltimore, will be the engineer in charge.

A Tale of Modern Farming

"Hidden Treasure" is the title of an admirable book from the pen of John Thomas Simpson and published by the J. B. Lippincott Company of Philadelphia. In narrative form it tells how an unproductive Pennsylvania farm was made highly profitable through the introduction of modern business methods. Concrete structures replaced the dilapidated and unsanitary barns and outhouses; fields were tile drained; waste land reclaimed through the use of wire fences; labor saving machinery substituted for hand implements, and the rule of thumb forced to give way to accurate calculations. The tale is not a forceful one; on the contrary its statements are thoroughly demonstrable, and are being proven on hundreds of progressive farms in all parts of the country.

Chain of Cuban Hotels

A syndicate of American capitalists plans the erection of at least six magnificent hotels upon the Island of Cuba, the structures to rival in comfort and attractiveness the hostelries found along the east coast of Florida.

Fear Car Shortage

C. W. KETCHAM, president of the Master Builders' Exchange of Philadelphia, fears that the expected car shortage due to the removal of crops, will seriously militate against the prompt movement of building materials. Speaking upon the subject Mr. Ketcham said:

"This season of the year we find the usual car shortage facing us. Each and every year, beginning with the month of August, this same condition confronts us. We have come to look upon this as a fixed thing.

"We know that at this season of the year the crops, of necessity, must be moved, but it is always at the expense of the other business that should also have the right of way.

"The manufacturer of building material faces this period of the year with fear and horror, knowing that it will prevent the movement of material from his plant to such an extent that it will retard the unloading of kilns, thus causing congestion, cessation and curtailment of output so vitally necessary to all concerned.

"The building operations must likewise suffer accordingly. Delays in securing cars of sufficient size or make and transportation are making the life of the builder and manufacturer at present a nightmare. Materials that should, for proper protection, be transported in closed box cars are now coming through in open cars, subjecting the material to exposure and serious damage en route, yet we have to submit to these conditions to get our supplies through to continue construction.

"We have become through years of such experiences so accustomed to this that we wonder if the time will ever come when we may find relief from such a condition. As the season advances the conditions will not improve. The scarcity of cars and the congestion of materials will increase. We therefore suggest that the contractors govern their actions accordingly and prepare as far ahead as possible for their need of the future."

Would Compel Installation of Automatic Sprinklers

IN the opinion of the Insurance Committee of the Canadian Chamber of Commerce, the installation of automatic sprinklers in certain classes of buildings should be made compulsory, so valuable an agency are they in reducing fire losses.

The report of the Committee relating to the subject is as here given:

"As statistics compiled by the Commission of Conservation show that 65 per cent. of the fire loss in Canada has been caused by 3 per cent. of the fires, your Committee felt that steps should be taken to compel the installation of automatic sprinklers in certain classes of buildings. Consequently, your Committee submitted to the Executive Council a copy of the following resolution which had been passed at the General Conference on Fire Prevention in Ottawa in December last:

Therefore be it resolved that this Committee recommend that a law be passed making it compulsory that a complete system of automatic sprinklers be installed in every building not of fire resistive construction and not having fire-proof floors:

(a) When the building contains machinery and (or) stock valued at over $200,000; or

(b) When the building has a ground floor area over 20,000 square feet if one story high; or over 15,000 square feet if two stories high; or over 10,000 square feet if three or four stories high, or if more than four stories high; or

(c) When the building is used as a factory premises and having over 100 employees, and that such a system be required to be installed in the basement only of warehouses and factories having a stock and (or) machinery valued at less than $200,000, but more than $50,000.

"Council, owing to the suggestion that such installation be made compulsory, referred the resolution back for further consideration. At the next meeting of Council your Committee reported as follows on this subject: 'After full consideration the unanimous sense of the Committee was that any recommendation for sprinkler equipment must be considered in the light of the sources of the supply of the equipment, and that it was essential to have some control over the sources of the product before compulsory legislation would be practicable.' This report was acceptable to Council.

"Your Committee believes that the installation of automatic sprinklers will have more effect than any other measure to reduce the loss of life and property through fire."

Turn Down $25,000,000 Court House Plan

Holding the construction of the $25,000,000 court house for New York county, designed by Guy Lowell in 1913, "financially impossible," the authorities have asked Mr. Lowell to substitute plans for a structure to cost about $5,000,000. When Mr. Lowell's original design was submitted, the cost of construction was estimated at $12,000,000. At present prices for labor and material it is figured practically twice that figure would be required. Hence the conclusion of the administration to erect a building more modest in conception.

$2,500,000 Building for Chamber of Commerce

At an executive session of directors of the United States Chamber of Commerce, it was decided to erect a $2,500,000 building at Washington, D. C., as a home for the organization.

Fire Protection For Schools

By H. W. FORSTER in the N. F. P. A. Quarterly

IT is a far cry from the little red schoolhouse on the hill, with its one room, its handful of pupils, its chief fire hazard, the stove, out in the open where it is easily seen, its bucket of water, and its doors opening into the yard, to the modern city school, several stories in height, housing hundreds of children, and presenting complicated problems of fire prevention, fire protection and egress.

The property loss in schools has been large; the loss of life has been considerable; the fire risk in most existing buildings is great. The thought, energy and money put into furthering life and property safety in schools have not even approached that warranted by the jeopardy to the lives of the nation's greatest asset—our children.

While considerable improvement has been made in the last decade in the construction of new buildings, and also in the improvement of many existing structures, the fact remains that the large majority of schools in use today may become charnel houses instead of effective agencies of human advancement.

Business men who have created excellently safeguarded manufacturing and merchandising properties when serving on boards of education apparently do not view the American child as worthy of the same protection as buildings, machinery and goods. Possibly they argue that children can walk out of a burning building whereas goods cannot. Generally in the event of fire the children do escape, but occasionally heaps of charred bodies of little children scathingly rebuke the judgment exercised and the parsimony practiced in the field of creating greater fire safety in schools.

Ignorance of even fundamental principles of fire prevention and fire protection on the part of those vested with the management of schools is one of the chief factors that make for the existing poor conditions. The general ignorance of the American public in this field is responsible for our tremendous annual fire tax and for the loss of several thousands of lives each year. This ignorance is particularly lamentable when it jeopardizes the lives of our children.

To a lesser, but nevertheless considerable extent, inertia, a feeling of the lack of responsibility and occasionally almost criminal disregard of known dangers result in action not being taken where, in a general way or even very specifically, the necessity for correction is known to exist.

Poverty An Important Factor

A discussion of fire safety in schools necessitates calling attention to the foregoing reasons for many of our unsatisfactory conditions, painful though such an arraignment may be to many entrusted with the management of educational institutions. It is only fair, however, to state that, important as are the factors of poor judgment, ignorance and failure to meet known responsibilities, the chief reason for our generally poor conditions undoubtedly lies in the almost universal poverty of our educational institutions.

Our schools must grow with the rapid growth of the country and with the increasing demand for better education on the part of our people. With few exceptions, every dollar that can be scraped together must be put into new buildings, additional equipment and increased teaching staff. The result is that fire prevention, protection and egress problems take second place.

Failure to meet the educational needs of the community results immediately in adverse comments from parents and from the press. The requirements of fire prevention, however, no matter how urgent their inherent need, seldom seem to be pressing. The good citizens who may urge action are commonly viewed as cranks. The likelihood is that during the tenure of office of a given school board no fire horror will take place in a school building under its control. Thus reasons the average director or trustee, and consequently fire prevention lags.

Gradual Improvement of Buildings

No matter how great may be the poverty of an educational institution, it should not disregard any fire precautions that are relatively inexpensive, and it should spend at least a moderate sum each year for the gradual improvement of its most dangerous buildings. When the seriousness of the situation is generally recognized—and it is a fact that over 90 per cent. of our school buildings are potential death-traps—prosperous and philanthropic citizens will leave money to their alma maters and to the school systems of their cities for the furthering of fire prevention instead of for the addition of another building, frequently of inferior construction.

One source of revenue for the protection of school property which has generally been overlooked is a portion of the insurance premiums which in a large number of our school systems are saved by the adoption of a policy of self-insurance. School boards are not in the habit of creating fire insurance funds as do many corporations. The money simply is not paid out, and in event of a fire the taxpayers are called upon to make up the loss. Without arguing as to whether or not such a policy is good business, particularly in view of the danger of conflagration, the fact remains that if Boards of Education would take a substantial percentage of the insurance charge which could properly be made against school operations, and make use of that for the gradual correction of the more dangerous buildings, very excellent progress would be made in a decade.

Children Versus Dollars

Secretary Franklin H. Wentworth, of the National Fire Protection Association, in an address in Boston at a time when the reduction of building standards for public schools was proposed, stated that he felt confident that he could stand on the corner of Tremont and School streets and in the course of a single afternoon, by appealing to the parents of the children who would be jeopardized in the poorer structure, collect enough money to make up the difference between the cost of a first-class building and of what was then being proposed.

It is preposterous to assume that this country cannot spend tens of millions of dollars, if necessary, to safeguard its school children. It is preposterous to assume that American communities require the experience of a Collinwood horror or a Peabody holocaust to prove to them the shortcomings of their school conditions.

The function of this article is not only to set forth the vital necessity of improving the conditions of our educational institutions, but also to point out specifically the problems which confront substantially every public school, private school, college or other institution.

The Essential Statistical Data

At the present time there are in the United States approximately 300,000 buildings used for educational purposes, valued at more than $3,000,000,000. A very considerable number are erected each year, and it has been estimated that for every two new schools erected each year one is destroyed by fire.

The Actuarial Bureau of the National Board of Fire Underwriters, reporting only on fires where insurance was in effect, advises that for the two years regarding which complete information is now available the facts are as follows:

	No. of fires	Property destroyed
1916	2321	$4,337,690
1917	2578	4,058,562

Because of the great extent to which schools carry their own insurance, it is certain that the total number of fires and the amount of losses have been greatly in excess of these figures.

No accurate records have been kept of the lives lost in school fires, or any other type of fires for that matter, and consequently exact data are not available.

The reasonable life loss in relation to the exceedingly large number of fires is due to a large extent to the fact that a very large percentage of fires in schoolhouses occur outside of school hours, and is not due to the safety of the buildings themselves.

The Essentials of Fire Safety

The essentials of fire safety for schools and, in fact, for practically all other structures, are developed more in detail later in this article. In order, however, that a clear grasp may be had of certain fundamental and commonsense principles, it is well to summarize in order that those interested may grasp the basic features of the whole problem.

Obviously the way to escape fire danger is to have no fires. That means fire prevention. Fire prevention has to do with removing the causes of fire, and covers the proper handling and storage of oils and other hazardous materials, the proper housekeeping measures, the disposal of waste of various kinds, the proper installation, inspection and maintenance of lighting and heating equipment, and attention to other similar fire hazards.

Many of these fire prevention measures are mechanical, but a far greater number depend upon human inspection and performance. It is regrettably true that the human factor cannot be depended upon, and that is chiefly why fire prevention measures alone are insufficient.

The next best thing to preventing a fire from starting is to see that any fire that starts is invariably extinguished while it is still small. The automatic sprinkler system is beyond question the most dependable device for accomplishing this, as is witnessed by a remarkable record of performance covering thirty-five years, which is summarized in the following statement unanimously passed by the National Fire Protection Association at its 1914 convention:

"It is today an almost unquestioned fact that automatic sprinklers afford the highest degree of protection against fire in practically all cases where there is combustible construction or material, the rapid burning of which is liable to be a menace to the lives of occupants of the building."

Structural improvements and the use of fire-resistive building material in new buildings make possible a degree of safety in them which cannot be secured in existing structures except by the application of automatic sprinklers. * * *

Causes of Fire

The records of the Actuarial Bureau of the National Board of Fire Underwriters show the principal causes of fires in schools to be lighting, stoves and furnaces, chimneys, matches and smoking, and spontaneous combustion in various materials. The order does not necessarily indicate the jeopardy to life or the relative amount of property destroyed.

The ordinary grammar school or recitation building, containing only classrooms and a basement with heating equipment and storage rooms, has fire hazards limited largely to heating and lighting systems and to poor housekeeping. The more modern schools, and especially high schools and trade schools, contain the hazard created by the use of power-operated machinery, combustible working materials, inflammable liquids, chemical laboratories, etc. The following sub-divisions of the causes of fire present the principal facts which a school management should know in order to secure a considerable degree of safety.

Hazardous Materials

Volatile Liquids.—Gasolene, benzine, alcohol and combustible metal polishes are commonly used by janitors and in connection with technical courses, for internal combustion engines, blow torches and cleaning machine parts. Their use should be restricted, the amount on hand reduced as much as possible, and necessary amounts should be kept in approved safety cans which are designed to prevent spilling, leakage or explosion. Many supplies, and even the safety cans when not in use, should be stored outside of the main building, unless there is a properly ventilated fire-resistive vault inside of the building. Only noncombustible metal polish should be used.

Oils and Paints.—Lubricating oil, lard oil for cutting metals, linseed oil and turpentine for painting and wood finishing, paints, varnishes, kerosene for cleaning blackboards, and other inflammable liquids find their way into schools, frequently in astonishingly large quantities. Some of these liquids are spontaneously combustible, all burn fiercely, and fire in them is hard to extinguish.

The main storage place for oils and paints should be a specially constructed oil house outside of main buildings. In cases where this is not feasible, a fire-resistive vault, properly drained and ventilated, should be used. Local supplies in the various workshops should be kept in metal cabinets provided with tight-closing doors and drip pans.

It is standard practice to use only electric lights in oil storage rooms, and such lights should be protected by vapor-proof globes. Switches for the lights should be located outside the room. Floor oils should not be used at all in schools.

Motion Picture Films.—Motion pictures are being used more and more for educational purposes. While the danger connected with the use of motion picture films in theatres has been greatly reduced by the enforcement of strict regulations concerning fire-resistive booths, construction of machines, smoking, operator's licenses, etc., these same regulations are not always complied with in the public schools. For example, a motion picture machine was found in use set loosely upon boards supported upon the backs of seats, operated by an untrained person, and discharging film into a wicker basket. The ordinary motion picture films burn with a rapidity approaching an explosion and give off stifling smoke. Slow-burning safety films can be secured and are practically free from fire hazard. The use of motion picture films in public schools should be given the most careful supervision, and where inflammable film is used should be allowed only with approved machines, properly installed in fire-resistive booths, and attended by licensed operators.

Housekeeping

While the number of fires directly attributed to housekeeping in schools is relatively low, poor housekeeping is so frequently a factor in the starting and spreading of fire that it is particularly to be avoided, especially as it costs nothing to maintain a high degree of cleanliness from a fire prevention standpoint.

Waste, Rags, and Mops.—Waste, rags and mops used for cleaning purposes are subject to spontaneous combustion, especially if oily, and should be burned immediately after use. Otherwise they should be kept in metal cans, or should be washed thoroughly and hung up. Clean waste and rags should always be kept in metal waste cans or covered metal barrels.

Waste Paper, Shavings, and Raffia.—Waste paper should be removed from the classrooms at the close of each school day, and should be burned, taken from the premises or baled. If baled to be sold, it should be stored after baling in an isolated building or fire-resistive vault. Teachers have been known to take loaded cartridges away from boys and deposit them in the waste paper basket. Live matches are also apt to find their way into the waste paper basket, and the best method is to remove the waste paper from the buildings as fast as it accumulates. * * *

Packing Material.—Packing material accumulates rapidly, especially in manual training schools where supplies are being continually received or finished work packed up for shipping. Packing materials should be disposed of as soon as shipments are unpacked, and all paper, excelsior and other combustible material that is kept on hand for packing purposes should be stored in a vault, in covered metal cans, or in covered metal or metal-lined bins. The covers of such bins should be equipped with stops so that they will always close by gravity. Where it is necessary to hold covers open for any length of time, this should be done by means of a fusible link.

Scenery, Decorations, and Booths.—In some of the more modern schools, especially in the high schools and colleges, auditoriums and assembly halls are provided with stages which are equipped with scenery for use in connection with amateur theatricals. In such cases the laws governing fire protection in theatres should be enforced. All scenery should be fireproofed, and a fireproofed proscenium curtain should be provided. * * *

Needless Combustible Material.—There is a case on record where a thorough house-cleaning of a group of public school buildings resulted not only in a material reduction of fire hazard, by virtue of the elimination of tons of needless combustible material, but also brought to light furniture and other school equipment which, when cleaned and repaired, represented a value of six thousand dollars. New equipment needs were consequently reduced by this amount.

At least once a year every school should be gone over as regards roofs, attics, classrooms, closets and basements in order to make certain that every bit of rubbish and unnecessary material is removed. For the ordinary-sized city an abandoned shool makes an excellent general storehouse for material and equipment not in active use in the schools.

Lockers.—The modern tendency is to provide central locker rooms with metal lockers in place of the old wardrobes and hall lockers. New lockers, no matter where located, should be of metal and have solid backs and side partitions to prevent spread of fire between them. Screen or punched plate doors are preferable to admit of inspection without unlocking.

Electricity

The insurance interests report that in 1916, 86 fires from electrical causes resulted in a loss of $585,054. In 1917 the number of fires was 70, with a property loss of $500,307. Electrical fires are therefore a very definite hazard in schools. The National Electric Code as issued by the National Board of Fire Underwriters contains specifications covering every detail of electrical installation, and compliance with these specifications will eliminate practically all fire hazard in connection with electrical equipment.

In grammar schools the electrical equipment consists mainly of wiring, lamps, switches and fuses. In the larger schools, however, especially in high schools and technical schools, the hazard is increased by the installation of rheostats, motors and various types of electrical heating devices. Some of the larger schools even operate generating systems. Only the most common electrical hazards are discussed herein.

Protecting Circuits.—Electric wiring should preferably be installed in conduit throughout. Where open wiring is used there is always the possibility of mechanical or other injury.

Pendant and Portable Cords.—The insulation on twisted pair cords deteriorates very quickly, and when in contact with metal there is danger of a short circuit which will start a fire. Portable cords should be used sparingly and should be of the heavy reinforced type, with a strong guard for the lamp.

Lamps.—The ordinary incandescent lamp gives off heat enough to be a serious fire menace. Wherever there is danger of lamps coming in contact with combustible material or being broken, they should be enclosed in substantial wire guards securely clamped to the lamp socket.

Combustible shades, often of paper or cardboard and sometimes even of celluloid, are found on pendant lamps, especially where these are used about machines. Where shades are necessary they should be of metal.

Heating Units.—Heating units, such as flat irons, hot plates, glue heaters and occasionally stoves, found in domestic science and manual training departments, should receive special attention, as they have a bad fire record. A red pilot light should be installed in the circuit with each heating unit, or connected series of units, to serve as a danger signal whenever the current is turned on. Metal or asbestos stands should be provided for irons, and proper air space should be maintained about all heating units.

Fuses.—Fuses are the safety valves of the electrical system and should be installed at the point where the wires enter the building and on each branch circuit. Open link fuses are still used in some of the old schools, and frequently cases are found where janitors or teachers have replaced blown fuses with copper wire, nails, or any other conducting material that happened to be handy. Such conditions subject the entire circuit to possible overloading and have caused many fires.

Stereopticon Lanterns.—Stereopticon lanterns generally require too much current to admit of their being on an ordinary lighting circuit. Where they are used it is therefore generally necessary to provide special connections.

Gas Lighting and Heating

The essential features to secure safety from gas lighting, other than care in handling matches, are:

a. Proper clearance over mantles and burners. Three feet is ordinarily necessary with a Welsbach mantle and two feet with a flat flame burner. Lesser distances than this require heat bells.

b. No swinging brackets where flames can come into contact with any combustible material.

c. Wire guards for flames to prevent people and materials from coming in contact with them.

d. Elimination of key control for gas lights where pupils might play with them.

Gas Stoves and Heaters.—Some of the hazards connected with the installation and use of gas stoves and heaters are common to other types of heating apparatus and will be discussed in another section. Rubber tubing, very commonly used for connecting gas stoves and heaters, should be absolutely prohibited, and with the possible exception of connections for Bunsen burners on benches in laboratories only permanent piping should be used.

Main control valves should be provided for all series of burners and heaters in laboratories and domestic science rooms for emergency, night and vacation use.

For lighting gas lights and heaters a metal friction lighter gives excellent service with no fire hazard. The general use of matches for this purpose should be prohibited.

Pilot lights are frequently provided for lights and heaters, especially hot water heaters. The accidental extinguishment of such pilot lights, followed by the escape of gas for a considerable period of time, has been the cause of numerous explosions. Consequently such heaters need stovepipe connections to separate chimney flues.

Lightning

In 1916 lightning started 376 schoolhouse fires in the United States, with a total loss of $61,811.00. In 1917 there was a loss of $199,789.00 as a result of 499 fires. Not a building that was struck was provided with lightning rod protection. Contrary to the common opinion, a lightning rod installation, properly designed and installed, affords decided protection for exposed buildings.

Chimneys.—It is amazing to note the indifference of most people to fire hazards of this type. The cutting of construction expenses by setting beams and floor joists into the brickwork of chimneys is poor economy, as witnessed by Figure 10, which shows a chimney with 4inch brick walls into which woodwork had been let.

The minimum specification for a brick chimney in a building of more than one story is 8-inch walls and a flue lining. For one-story buildings with an ordinary stove a 4-inch chimney with flue lining may be built directly on the ground. All chimneys and pipes should be thoroughly cleaned each fall before fires are started.

Stoves, Furnaces, and Boilers.—The hazard of cracked stoves and poorly supported stovepipes with open joints is obvious. While stoves and furnaces should be operated in a manner to prevent overheating, they should be so located that serious overheating will not set fire to the building or nearby storage.

Any woodwork heated to 150 deg. C. or over for any length of time is liable to ignite, and all heating apparatus must be installed with this fact in mind.

Boilers and furnaces should always rest directly on the ground or on absolutely incombustible construction; never on wood, even if protected.

Where stoves must be placed on combustible construction, they should be raised on legs or supported beams at least 6 inches and preferably 12 inches from the floor, ventilation being thus afforded.

Floors should be protected over a liberal area with metal on asbestos.

Proper clearance overhead where floor above is of wood will vary with the heating device, but should not be less than 2 feet with a furnace and 3 feet with a boiler. For stovepipes the minimum clearance is generally placed at 12 inches, although 18 inches is better. Ample clearances from wooden walls and partitions is as important as adequate headroom.

Other Heating Devices.—In addition to the usual heating devices, schools are likely to have in them hot plates used in domestic science courses, glue heaters in woodworking shops, forges, annealing furnaces, and blow torches in blacksmith and machine shops, stoves, mangles and irons in laundries and gas heaters at lunch counters. In connection with all of these there are fire hazards which must be guarded against.

Some isolated schools do not have gas available for use in domestic science courses, and if kerosene stoves are used they should be of the standard blue flame type with removable reservoirs, so that these may be filled outside.

Under no consideration should gasolene be used for heating, lighting or cleaning purposes.

Ashes.—Ashes, apparently cold, are responsible for many fires, and the danger is increased materially by mixing combustible rubbish with them. Ashes while inside of buildings belong in covered metal cans or on cement floors away from woodwork.

Steam Pipes.—The possibility of fire occurring through contact of hot steam pipes with woodwork is questioned by many, but the danger has been definitely established. In the case of the Collinwood School fire, the official verdict was that the steam pipe passed through a closet near the foot of the stairs and was undoubtedly the cause of the fire which destroyed 175 lives. Proper insulation or air space should be provided about all steam pipes where they pass through floors or partitions. Where air space is relied on for safety, pipes should be centrally supported in the openings. Where there is danger of combustible material coming in contact with the hot pipes, guards should be installed or the pipes should be covered with insulation. In cloak rooms, where clothing is apt to hang against radiators, these should be protected with wire screen guards. * * *

Matches and Smoking

The insurance reports indicate that the smoking and match hazards were responsible in 1916 for 118 fires involving a loss of $204,726, and in 1917 for 274 fires involving a loss of $259,287. In spite of the efforts of school authorities to the contrary, boys steal away to smoke, and naturally go to unfrequented places, which increases the fire hazard. Hastily discarded matches and cigarettes carry with them a very considerable danger. Janitors also frequently smoke in basements of schools while they are in session. It is obvious that smoking should not be allowed on school property at any time. * * *

Fire Extinguishing

It is startling to see how little provision is made for fire fighting in the average school. It is even more startling to observe the poor upkeep of equipment and the ignorance of the janitors and the faculty as to its use. Extreme instances of this perhaps are the case of a school for mentally deficient children, where the fire inspector was held in the office of the principal until the janitor could fill the few pails of which the school boasted, the hastily drawn *warm* water proving the duplicity of the principal, and the case of a school for crippled children in which a few obsolete heavy extinguishers which no one knew how to use were all that could be relied upon to put out an incipient fire and save scores of helpless children, some of whom were as high up as the third floor.

Life loss possibilities and property protection necessities make essential at least reasonable fire-fighting equipment in all buildings and automatic sprinkler protection in many dangerous structures.

Public fire departments, important as they are from a property protection standpoint, are relatively unimportant as life protection factors. Between the time the fire breaks out and the beginning of life-saving activities by the department many minutes always elapse, even in large cities, and the first few minutes may suffice for a large life loss.

For isolated country schools, especially of the college type, good water supplies, fire mains, hydrants, hose, ladders and other equipment are essential for property protection purposes but the features of such a protection system will not be discussed here, as that is an intricate engineering problem, varying greatly with the conditions. This article will be confined to the fire-fighting equipment which may go into the school building proper.

Automatic Sprinklers

Some school boards and principals either have not understood the value of sprinklers or have been prejudiced against them, but in many of the older schools automatic sprinklers are the logical answer to the problem of securing greater life safety. Unfortunately, in many cities conditions are such that the best proposition by no means goes through, as witnessed by the notorious case of a certain city which suffered a serious loss in its schools and which invested funds, sufficient to provide adequate sprinkler protection, in an installation of stamped metal ceilings.

While the school buildings should be equipped with hand extinguishing apparatus, the ordinary school over one story high, if of combustible construction, needs automatic sprinklers, and needs them badly.

Frequently an installation of sprinklers will furnish a sufficient degree of protection to render unnecessary expensive structural changes that would otherwise be imperative in the interests of safety.

The sprinkler, if properly maintained, is on duty day and night, goes into action as soon as the fire reaches modest proportions, is not affected by smoke as are human fire fighters, and can be arranged to give an alarm the moment water flows from the sprinkler system.

Sprinkler heads are made with a special solder which melts at about 160 deg. F., which is less than the boiling point of water. The sprinkler has a ½-inch orifice or nozzle and a deflector, and under usual pressures will discharge 15 to 20 gallons of water per minute in the form of a drenching spray over an area of perhaps 15 feet in diameter. As the sprinklers are seldom placed over 10 feet apart, these spray circles overlap, and a fire has little chance to burn or spread.

Instances of Sprinklers Installed in Schools.—It is gratifying to know that a considerable number of sprinkler equipments have been installed in schools.

Partial Installations Frequently Advisable.—In cities where it is impracticable for financial reasons to install the full equipment considered desirable, the following procedure may be adopted:

(*a*) All school buildings which are under the jurisdiction of the board which is considering sprinkler protection should be listed in the order of their relative danger to life, taking into account construction, exits, operations carried on therein, and any other essential factors.

(*b*) Sprinklers should be provided in the basements of school buildings in the order of their standing on the relative hazard scale.

(*c*) These sprinkler systems should all be arranged so that they can later be extended to upper floors of the building.

(*d*) After basements of all buildings, except the very finest, modern, incombustible ones, have been equipped, the installations should be extended upward, again beginning with the more hazardous on the list.

(*e*) In this manner a given amount of money will be used most effectively, and ultimately all combustible schools can be fully protected.

The reason for this proposal will be evident upon reflection. Fires above people seldom jeopardize their lives. If there are two ways out of a given room, a fire on the same floor is not a very serious matter, assuming that all rooms are occupied, fire promptly discovered and alarm given. On the other hand, fires below persons, and particularly fires in the basement where rapid spread has unfortunately been the general rule, are most to be feared. Practically all persons are above a basement fire, and fires spread upward far more rapidly than horizontally or downward. The Collinwood and Peabody life loss resulted from basement fires.

There has been altogether too much tendency on the part of a school board to find that it would cost tens of thousands of dollars to install sprinklers throughout the schools in the city and to assume that because the whole sum was not forthcoming no beginning should be made. If sufficient funds can be found to sprinkler the basement of the worst building a worth-while step will have been taken.

Inside Hose Protection

In high schools and colleges, especially where these are without public protection, there is generally advantage in an installation of inside hose, provided that there are trained persons to use the equipment to advantage.

In all schools a hose connection should be provided in the boiler or furnace room to wet down ashes and to use on incipient fires.

Chemical Extinguishers

Approved extinguishers of the soda and acid type should be distributed throughout all school buildings. From any point in any school corridor at least two fire extinguishers of this type should be plainly visible, and they should be located not more than 100 feet apart. At least one extinguisher should be placed in each laboratory, woodworking shop, basement or other place where there is any special hazard. * * *

Water Pails

A pail of water is the oldest, cheapest and most generally used fire extinguishing agent. It is difficult, however, for anyone, and especially for children, to throw water accurately from a pail for any distance, and it is advisable, therefore, to install water pails chiefly in basements, woodworking shops, storerooms, and attic spaces where burning material is likely to be on or near the floor. * * *

Sand Pails

Sand is an effective extinguisher of fires in oil or electrical equipment, but should never be used about motors or generators because of possible damage to equipment. Sand pails, provided with scoops for scattering the sand, should be placed near switchboards and similar electrical apparatus and close to all storage places for oils and paints.

Dry Powder Tubes

Tubes filled with bicarbonate of soda are to be found in many of the older schools. If a theater attendant at the time of the Iroquois disaster had used a "soda and acid" extinguisher instead of trying to use a dry powder tube six hundred lives might have been saved. The best rule is to discard all dry powder tubes.

Hand Grenades

Hand grenades are of little more value than the dry powder tubes, and should be discarded whenever found.

Blankets

A heavy woolen blanket should be provided for each chemical laboratory or domestic science cooking room to smother fires in clothing. * * *

Egress for Occupants

The fatuous faith of the majority of school authorities and laymen in the life-saving power of outside fire escapes is a constant source of wonder and pain to the student of fire protection for schools. Some escapes are wide and properly railed; the stairs have an easy pitch; access to them is direct; they lead to the ground; they are located opposite blank walls or pass windows protected with metal frames and wired glass; they are a valuable means of egress if used. The large majority of fire escapes, however, are a delusion; they may prove death-traps.

Narrow, steep, reached by climbing over window sills, terminating many feet from the ground, passing windows out of which flames are likely to pour, never used at times of drill, they are a monument to the ignorance of the authorities and the selling ability of the manufacturers. An outside fire escape on a school building is generally an admission of the inadequacy of its normal exit facilities.

In a one-story school that has ideal egress facilities, no group life loss is possible. The conditions in the Collinwood School, where 175 lives were lost, were similar to the present situation in thousands of our schools. Each school problem needs careful study to the end that adequate egress facilities may be provided and that these facilities may be promptly and intelligently used.

Fundamentals of Good Egress

It should be possible to empty a school building of ordinary height and ordinary construction in not more than three minutes; two are preferable. Elements that need consideration are:

(*a*) An alarm system for prompt notification of fire or of drill.

(*b*) Proper individual room aisles to admit of quick marshalling of children.

(*c*) Adequate door or doors to corridors, to inside stairs directly, to other rooms, or to outside towers or escapes.

(*d*) Sufficiently wide, straight, unobstructed halls.

(*e*) Stairs ample as regards number and of proper width, handrails, preferably enclosures, and separations to protect against smoke blocking all stairs.

(*f*) Direct exit from stairs to outside without forcing pupils to enter lower halls.

(*g*) Special egress facilities for auditoriums, gymnasiums, lecture rooms, and other points where large numbers of persons congregate.

(*h*) Carefully planned and frequently held egress drills.

Alarm Systems

All school buildings, with the possible exception of small one-story structures, should be provided with a dependable means for giving prompt alarm at time of fire. In small buildings of more than one story a vertical rod from basement to top floor, provided with an operating handle at each floor and connected to one or more large gongs, will answer. In larger and more complicated buildings, however, it is necessary to use electrical systems. Gongs should be so located that they can be heard plainly in every portion of the building, and one signal station for every twelve rooms is a fair standard, although this will, of course, be varied according to arrangement.

Thermostats.—Approved thermostatic (automatic) fire alarm systems operate on a moderately rapid increase in temperature. Such systems are similar in action to an automatic sprinkler system, but lack the extinguishing feature. Probably for this reason their installation has been limited to cases where there was a keen interest in fire protection, but where funds were not available for the installation of automatic sprinkler systems.

Sprinkler Alarms.—Where automatic sprinkler systems are installed fire alarm can be automatically given by means of a water flow alarm valve connected to gongs throughout the building. This is probably the most efficient fire alarm system devised, as the starting of the fire, operation of sprinkler head to extinguish it and the sounding of alarm are almost simultaneous.

Standard Signals.—The number of rings used as fire alarm signals vary in different localities, but the 4-4 signal is considered standard, and it is recommended that this be used throughout the country. Especially should the same signal be used in all schools in any one city, as teachers and pupils are apt to change frequently. * * *

Means of Egress

Individual Room Exits.—In the opinion of many good judges all classrooms, laboratories, etc., should preferably have two exits, one leading to the corridor or to an inside stairway directly, and the other to a similar stairway, a fire tower, an outside escape, or an adjoining room from which a second means of egress can be reached. On the other hand, some are inclined to think that the single exit in buildings of good construction has an advantage from the viewpoint of maintaining discipline in time of panic.

In many cities portable one-room school units are in use, and these frequently are provided with but one exit, which is generally used to connect them to the main building. A separate outside exit should be provided.

School basements, especially where basement rooms are used as classrooms, should have exits leading directly to the outside.

Corridors.—One acceptable rule regarding corridor widths is 8 feet for a building having eight classrooms on a floor, and one foot more or less for every two rooms above or below this figure. The corridors should not terminate in dead ends.

Stairways should preferably be located at all turns or ends of corridors. Sloping floors or ramps should be avoided where possible and, if necessary, their pitch should not exceed one foot in eight.

All openings which subject corridors to serious exposure, such as windows overlooking combustible roofs or doors communicating with laboratories, woodworking rooms and other hazardous places, should be protected by wired glass in metal sash or by fire doors.

Larger Meeting Rooms.—The necessity of adequate means of egress from auditoriums, gymnasiums, lecture rooms, laboratories or other places of general assembly is evident. Where not located on the ground floor, there ordinarily should be separate exits leading directly to the outside. Doors should open outward and be kept clear of chairs and other objects.

Number of Stairways

The stairway arrangement of every school, old or new, should meet the fundamental rule of at least two ways of egress being available from any class or assembly room. The arrangements should be such that there is only a remote chance of both exits being cut off by smoke or fire at the same time. The more common arrangement, of course, is to have two stairs connected with the same corridor into which, in turn, all rooms open. If two such stairs are fairly close together, they cannot be properly considered separate means of egress unless enclosed in fire-resistive or fire-retarding partitions equipped with smoke-proof doors.

Account must be taken of the possibility of one stairway at least being blocked by fire or smoke, the other or others being called on to provide adequate egress under those conditions.

It is commonly assumed that a standard 4-foot or 5-foot inside stair will pass in drill formation 120 pupils per minute, or 60 in each of the two lines. To be conservative, this figure should be reduced to about 45 per minute per file past a given point.

Stairway Construction

Measured between handrails, the width of stairways should never be less than 3 feet and never more than 5 feet unless intermediate handrails are provided. In new construction the best practice is to have the stairs 4 feet wide. Stairways should preferably be incombustible, and should be kept absolutely free from obstruction.

The stairway plan should be simple, and stairs should be of uniform width throughout their length. Winding stairs should never be permitted.

Handrails

Handrails should be provided at both sides of all stairways and also at intermediate points where more than one double column of pupils is to be accommodated. Ends of rails should be curved to prevent pupils running into them. Balustrades should be at least 3 feet high.

Fire Escapes

Adequate exits in new buildings should preferably be secured without resorting to fire escapes. On many existing buildings, however, fire escapes are necessary because of the inadequacy of the inside stairways. Where necessary, their construction and installation should be in accordance with the National Fire Protection Association rules.

Fire escape stairways should extend to the ground. Where for any reason it is not possible to continue the stair to the ground, a counter-balanced section is necessary.

Smokeproof Towers

The Philadelphia Fire Tower in its various modifications provides the safest means yet devised of egress from upper floors of buildings. The stairway is cut off from the building by fire walls and fire doors, making it impossible for either smoke or flames to enter the tower.

Such towers can serve every normal stairway need in all save extremely cold climates. Scores of schools in North Carolina have only smokeproof tower stairs.

Horizontal Egress

Planning new school buildings of large area, these should be sub-divided by one or more approved fire-resistive partitions. Even in old buildings it is occasionally advantageous to install such partitions. Sometimes existing walls can be improved to serve this purpose. Where buildings are thus sub-divided the first concern at time of fire should be to get the children through the partition out of the section in which the fire is located and into the section which is safe.

Signs and Lighting

Red and white exit signs, with letters at least 5 inches high and illuminated at night, should be placed over all stairways and doors leading directly to the outside. Exit signs should not be omitted over doors leading from roofs and basements. Secondary egress signs for classrooms, auditoriums, laboratories, etc., may be advisable in large schools.

In order to simplify instructions, all stairways and outside exit doors can be numbered and these numbers used for drill and other purposes.

The current for exit lights should preferably be obtained from a system separate from that ordinarily used for lighting purposes. It is also well to provide auxiliary gas lights for use in case the electric service is interrupted. * * *

Spread of Fire

The almost lightning-like speed with which many fires spread is generally due to a combination of combustible construction, large unbroken areas, open stairways, and various floor openings. Many of the older wooden interior schools, with central open wooden stairs, and frequently without even the basement stairway cut off, are ideally designed for a quick-spreading fire that would cut off escape of the occupants. The studding, furthermore, is often unstopped from the basement to the attic, and a few minutes after a basement fire got under way the attic would be a mass of flames and the building doomed.

In contrast to such a school is the modern fire-resistive structure in which the amount of combustible material is reduced to a minimum, the fire areas are moderate, each room is capable of confining within its limits a fire of considerable intensity, egress stairs and other shafts are enclosed and there are two ways out from each important point.

New Buildings

There is no excuse for anything but the best construction for new schools. The difference in cost between the best construction and distinctly dangerous construction is never enough to warrant exposing our children. Occasionally the better building is the cheaper. The literature of the National Board of Fire Underwriters, the National Fire Protection Association and the National Education Association is particularly valuable to the architect called upon to design a new school.

One-story schools need not be of fire-resistive construction to secure adequate life safety if they have individual room exits.

Two-story schools seldom need be of fire-resistive construction if areas are moderate and if adequately protected exits are provided.

Three-story and higher schools should be fire-resistive in the best sense of the word, with stairs and other vertical openings protected.

It is particularly important that where additions are built to existing buildings the new construction be modern from a fire standpoint and not a duplicate of the old, and that there be a definite fire cut-off between these two sections.

Existing Buildings

Obviously our fire dangers lie chiefly in our older schools two stories or more in height. Improving them as regards the restriction of fire spread is often desirable and occasionally undertaken. The installation of sprinkler equipment may in some cases be cheaper than structural changes and yet provide the same improvement in life safety.

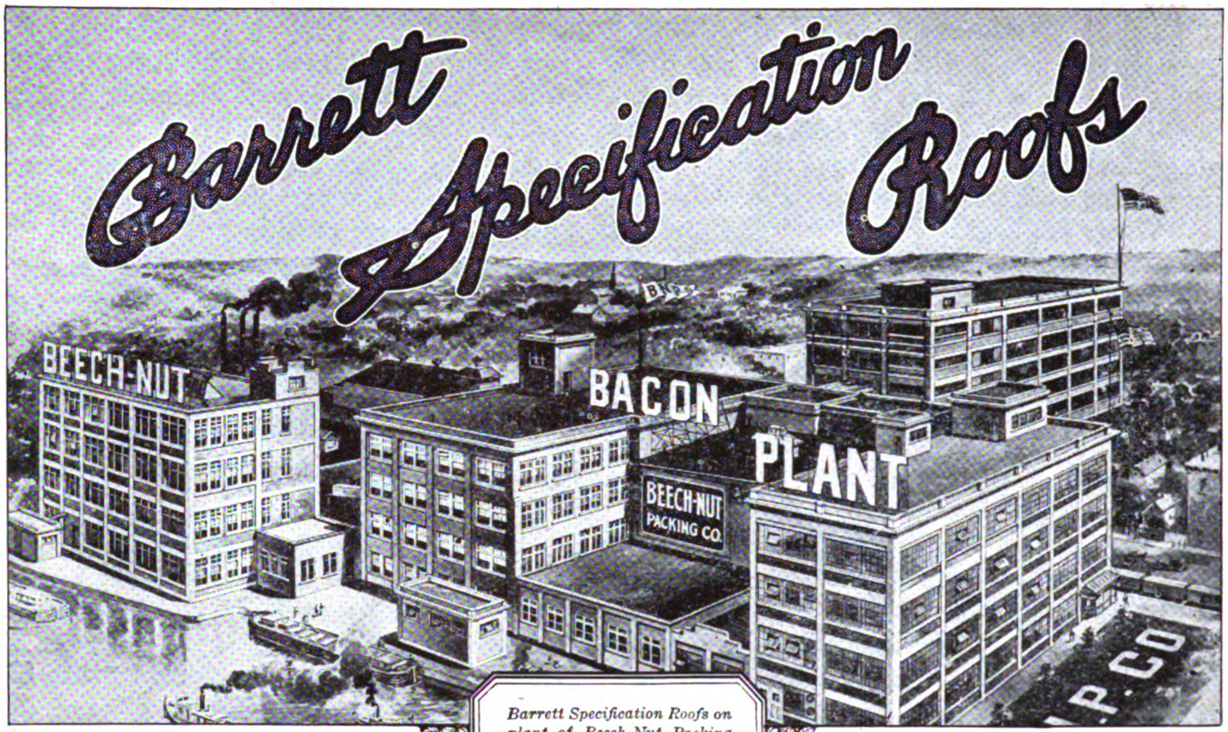
It is a common fallacy to assume that because a building has brick or stone walls it is relatively safe. From a life safety standpoint there is little to choose between a building that has incombustible walls and one which has wooden walls. The danger lies in wooden interior construction, permitting the fire to spread upward through stair and other openings, to run through open studding, and sometimes in the relatively early stages of fire even to burn through the floor.

Improvements of the kind that are certain to need consideration in any city of size and in connection with groups of college buildings include the following:

Cutting Off Stairs.—The basement fire is the most dangerous, and the first steps should be to cut off the basement stairs effectively and to stop off equally well all other openings which might let fire spread from the basement upward. For buildings of ordinary construction expanded metal nailed on both sides of wood studs and covered with hard plaster makes an effective enclosure. Doors are desirable both at the top and bottom of basement stairs. The loss of life in the Peabody School has been attributed to the curiosity of a child who opened a door leading from the basement stairs to the first story, and admitted fire into the hall where children were crowded.

For most buildings of two stories or higher it is desirable that other stairs also be enclosed. Expanded metal and plaster partitions or metal and wired glass are satisfactory for this purpose. The doors leading to stairs should normally be kept closed and should not be too heavy.

Other Vertical Openings.—Any other form of floor



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opening should be eliminated or enclosed as may be most practicable. Light wells are particularly objectionable. Elevator shafts and dumb waiters should be treated in the same way as stair shafts. The spaces between the studding should be cut off with cement, mineral wool, timber, or a combination of these, particularly at the basement ceiling and also preferably at the attic line.

Division Walls.—Sometimes in large buildings it is possible to make fairly effective fire walls of existing walls. Unnecessary openings can be bricked up, walls can be carried through the attic and the roof, timbers which originally passed through the walls can be cut off so as not to create a continuous combustible channel through the wall, and necessary fire doors can be provided. Generally speaking, if improvements of this kind are undertaken it is well to do the work in such a way that it will have distinct property saving value, and not merely give somewhat greater life protection.

In some combustible schools of large area the only proper treatment is to build one or more effective fire partitions across the building. Some of the large public and private school buildings in the country are hundreds of feet long, the equivalent of five or six floor levels in height, and literally without any semblance of a fire stop either horizontally or vertically. Such conditions in a factory or mercantile block would be considered little short of an economic crime, and it certainly is quite as desirable that the same steps which would be taken in a business building be taken in a building housing hundreds of children, many of them young and some physically handicapped.

Fireproofing Dangerous Sections.—Not infrequently it has been found advisable in school buildings of combustible construction to make the boiler room strictly incombustible and to build effective fire-resistive oil rooms or vaults. Such special hazards properly belong outside of the structure, but if they must be inside of the building by virtue of the geographic conditions, then incombustible construction is often the answer.

Exposure

The biggest factor in preventing exposure fires from affecting school buildings is to eliminate shingle or other combustible roofing. Shingle roofs are objectionable also because sparks or brands from the chimneys of the school itself may set fire to the roof. No existing shingle roofs should be permitted to be repaired extensively with wood shingles. Various approved forms of fire-resistant roofing materials weighing about the same as wood shingles may be installed without appreciable difference in cost.

Occasionally where school buildings of importance are close to combustible exposing structures it is desirable to do away with overhanging wood roofs by carrying the walls up above the roofs in the form of parapets and by providing metal frames and wired glass for windows and fire doors for door openings.

Wired glass in metal frames is used extensively to protect persons who may use a fire escape against fire within the building.

Legislation

Some good legislation has been enacted in a number of states during the past few years for furthering fire protection for schoolhouses. The best of this legislation, however, has been directed almost entirely toward the improvement of exit facilities and toward securing better construction in new buildings. For this reason it has had very little effect upon reducing the monetary fire loss, as it has been aimed neither at the causes of fire nor toward providing better fire extinguishing facilities.

A great weakness in present legislation lies in the all too frequent use of such indefinite terms as "sufficient," "proper," "ample," "necessary" and "suitable." This commonly places the responsibility for interpretation upon untrained persons, and among these there is much disagreement as to proper procedure. Even where there is fairly specific legislation it is seldom thoroughly enforced. In the face of the opposition and differences of opinion encountered, it is exceedingly difficult for fire marshals, fire chiefs, or any others interested in the matter to secure proper enforcement of the laws.

Most of this legislation has been enacted as the direct result of some especially severe fire loss, and the features covered have generally been only those which were most forcibly brought out in that particular fire. With the exception of a very few states, there has been little done in the way of systematic study of the fire protection problem in schools and colleges. What little has been done shows the great inadequacy of state legislation as it now stands. New York City found it necessary to enforce eight separate regulations to cover the main points of protection in the public schools of the city. The majority of state laws make no reference to fire protection in colleges and universities.

New Construction.—One important need is for the establishment of standards of new building construction. This can be most easily and satisfactorily met by adopting the recommendations embodied in the building code of the National Board of Fire Underwriters, copies of which can be secured from that organization. Standards must also be established for such matters as housekeeping, safeguarding of special hazards, egress facilities, fire drills and extinguishing equipment. The data available through the National Board of Fire Underwriters and the National Fire Protection Association will fill practically every legislative need.

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Building Material Prices Stabilized

STRONG pressure is being brought to bear upon the entire Eastern building construction industry to reach a basis of agreement between labor and employers, so that construction, now that material prices are practically stabilized, may proceed with some semblance of freedom, says the Dow Service Daily Building Reports.

Several important economic factors are operating to stimulate building construction now. In fact, the start already has been made. New York mason material dealers, compiling their reports for actual movement of materials from their yards to actual building operations in July, will show a gain of more than 47 per cent. in volume over June and approximately 11 per cent. gain over the best month since July, 1917. This gain shows a construction market for New York, in spite of handicaps of labor strikes and harbor transportation delays, of about 49 per cent. of a normal pre-war building season.

The volume of building construction easily could be between 60 and 70 per cent. of a pre-war normal year if skilled building labor and employers could effect a maximum wage scale for all trades for a definite period into the future. Building construction is being retarded now mainly because responsible contractors are not inclined to freely figure prospective work. They will adhere to this policy so long as there is no certainty as to how long wage scales will remain at a given level. The point in issue will probably be developed this week. If recourse is taken to a lockout to bring the issue to a point, it is more than likely that considerable impetus will be given to the Bronx house building boom, because the organized employers are more concerned with the big commercial operations in this and other cities.

July Costs Are Higher

Index figures pointing to the high cost of living show that July costs were higher than those of June, but that general costs were much higher for the same months last year. Economists studying the factors entering into the cost of living and cost of construction of buildings concur in the belief that the high level has been touched or is almost within touching distance. The best minds in the building material producing and distributing markets admit that the top has been reached, except insofar as the cost of labor ascends and, perhaps, also, the impending advances in freight rates, which is not generally considered an important factor in its relation to the actual cost of the construction of a building, at the present time. This realization of the limit of elasticity to construction costs is shown clearly in current price tables covering not only delivered prices in this market, but delivered building material prices in the leading cities of the country. There has been a noticeable halt in the heedless price advances that have featured the building material market in the first six months of the year. Producers have reached a plateau at which they are apparently trying to hold quotations at least, until such time as actual building construction will so sap building material supply as to force prices upward.

It is believed that the high price peak of building materials has been reached, however. Price advances up to the present time have been attributable largely to increased cost of wages. The element of supply and demand for these finished building materials has not been noticeably operative in any line, with the exception of Portland cement, sand, crushed stone, and gravel, lumber and one or two specialties. Once a standard of wage scale is fixed for a term sufficiently long to enable contractors to figure the vast volume of building work they are asked to estimate on, there will be a call for building materials from consuming sources as to force prices much higher. It is felt that if labor would wait for that time to come before asking for wage increases in such quick succession that manufacturers or contractors cannot adjust their figures before another wage boost is demanded, both invested capital and labor would enjoy the fruits of a nation-wide era of building operations that, without question, will pass beyond bounds not now easily imagined.

$2,000,000 Apartment Hotel for Washington

At an estimated cost of $2,000,000 a new apartment hotel is to be erected in the fashionable embassy district of Washington, D. C., the structure to be known as the Washington Properties Apartment Building. It will be eight stories high, and will contain 700 rooms, arranged in suites.

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